Internet Engineering Task Force
Internet-Draft
Intended status: Experimental
Expires: March 9, 2020

L. Donnerhacke
Fitug e.V.

September 6, 2019

Rights for restricted content
draft-donnerhacke-linktax-04

Abstract

Links are omnipresent in the Internet to provide access to other resources. There is no mechanism to express differences in law systems, access limitations, or arbitrary rules defined by the owner of the linked resource. Therefore links do depend on and enforce a communist sharing ideology, which ignores the content owner rights.

Links may point to resources far away from the originating page, hiding this fact from the customer. It takes the data transport services for free, internet transit providers on the way from the content source to the customers are not extra payed for this effort. In many cases, the remote company generates huge amount of money from the customers worldwide not shared with the transit providers.

In order to get the rights of all involved parties balanced, a new type of connection initiation is proposed: The Right.

Status of This Memo

This Internet-Draft is submitted in full conformance with the provisions of BCP 78 and BCP 79.

Internet-Drafts are working documents of the Internet Engineering Task Force (IETF). Note that other groups may also distribute working documents as Internet-Drafts. The list of current Internet-Drafts is at https://datatracker.ietf.org/drafts/current/.

Internet-Drafts are draft documents valid for a maximum of six months and may be updated, replaced, or obsoleted by other documents at any time. It is inappropriate to use Internet-Drafts as reference material or to cite them other than as "work in progress."

This Internet-Draft will expire on March 9, 2020.

Copyright Notice

Copyright (c) 2019 IETF Trust and the persons identified as the document authors. All rights reserved.

This document is subject to BCP 78 and the IETF Trust's Legal Provisions Relating to IETF Documents (https://trustee.ietf.org/license-info) in effect on the date of publication of this document. Please review these documents carefully, as they describe your rights and restrictions with respect to this document. Code Components extracted from this document must include Simplified BSD License text as described in Section 4.e of the Trust Legal Provisions and are provided without warranty as described in the Simplified BSD License.

Table of Contents

1. Introduction 2
1.1. Background 3
1.2. Requirements Language 3
1.3. Success conditions 4
2. Referencing restricted content 5
2.1. The RIGHT element 5
2.2. Monetization 5
2.2.1. Prepaid references 5
2.2.2. Pay per use 6
2.3. Digital Rights Management 6
3. Compensate transit providers 7
3.1. Routing Considerations 7
3.2. Option Format 7
3.3. Offering services 8
3.4. Accepting offers 9
4. Acknowledgements 9
5. IANA Considerations 9
6. Security Considerations 9
7. References 10
7.1. Normative References 10
7.2. Informative References 11
Author's Address 11

1. Introduction

The current Internet is best described by the famous quote "From each according to his ability, to each according to his needs" by Karl Marx [14]. In the Internet everybody provides its resources for the use by anybody else. This is the basic concept behind the hyperlink.

On the other hand the concept of intellectual property requires to have a contractual relationship before use of the requested resource. In order to fulfil the needs of the intellectual property industry, additional elements needs to be implemented in the Internet.

Using the mechanisms defined in this memo, content owners can decide the model of access to their property. They are free to choose new mechanisms and monetize their content, or to keep in line with open and free Internet by using the already existing mechanisms.

On the other hand Internet access providers seek for methods to participate on such monetization. They want to offer higher level of service quality to specific content providers. This memo allowes access providers to offer QoS for monetized content and get paid if the offer was accepted by the content provider.

1.1. Background

German publishers tries to establish a right on news and other aggregated information for more than one century [13]. The latest spin was to promote the idea of a link tax by the German publisher "Axel Springer". They simply claim, that "Links" can't be free and that the Internet is a "Rechts-freier Raum" (lawless space). To overcome this situation, they invented the "Leistungsschutzrecht", which in turn is the founding of the EU proposal [11].

Implementing this memo will satisfy all those claims:

They can choose to monetize their content by using the "right" instead of the "link" element. If they are using "link", they agree to not sue anybody over the use of the resource.

If they choose "right", they can limit the amount of usage of the reference. This way the can obtain money from the referencing page (i.e. a news aggregator).

If they choose "right", they even can limit the usage of the content itself. They can prevent i.e. printing or sharing by the customer.

1.2. Requirements Language

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this memo are to be interpreted as described in RFC 2119 [10].

1.3. Success conditions

This memo specifies an experiment. It tries to make a political offer to those parties, which constantly want to change the Internet in favor of their own needs. By defining a technical solution for the announced problems, the political decision process has another alternative to accepting or denying the requested laws. This memo allows to acknowledge the needs of the interested parties without harming the existing Internet.

Now the political decision process has to choose one from the following possibilities:

Denying the requests completely,

Allowing the requests and point them to this memo for implementation,

or to actively changing the existing Internet in order to fulfil the requests.

In order to be successful, this memo needs to match the following technical criteria:

An implementation of the RIGHT tag must exist for popular browsers. For now it's sufficient to be implemented by plugins.

At the minimal level users must be able to click on RIGHT references. get a dialog about the licence issues and can select to follow the the reference or not.

Futheremore there should be an implementation of the TCP flag operations on client side for at least one operating system. This implementation should be able to set a socket option TCP_ASN, which sets the tcp header option accordingly.

There should be an implementation of the TCP flag option on the server side for at least one operating system. This implementation should be able to get a socket option TCP_ACK, which reads the received tcp header option for an accepted TCP session.

Initially all ASN offers could be either accepted or rejected at the server side.

Given this list of preconditions, the server side processing of RIGHTs is only a subject of local application progamming.

2. Referencing restricted content

References to remote content are currently done using "links". The only relevant environment for the purposes of this memo is the World Wide Web. There the "link" is represented by the <LINK> element [8] or the <A> element [9].

2.1. The RIGHT element

The new <RIGHT> element is a modification of the existing <LINK> element [8]. It differs from the former by the retrieval method used by the client browser, and two additional attributes.

When accessing the referenced resource of the RIGHT element, the browser SHOULD initiate the connection using the TCP options described in Section 3.

2.2. Monetization

Wenn referencing a resource one of the following monetization methods MUST be used. The methods are mutually exclusive.

2.2.1. Prepaid references

The RIGHT element MAY have an attribute named "prepaid", which contains an opaque token. The token SHOULD be a Base64 string [4]. The attribute MUST not processed, if the token does exceed the Base64 charset. It MAY even check, if the token is really a Base64 encoding.

Any valid token MUST be copied to a new HTTP header line "Right: prepaid=token" when requesting the referenced resource. If the attribute does not exist or is invalid, the line SHOULD be omitted.

The resource provider MAY use this token to validate, that the resource was legally requested. If the token is invalid, it MAY respond with the error code 402. It MUST NOT respond with error code 451 [7].

The resource provider MUST provide an API, where new tokens can be obtained. Access to the API SHOULD be limited to paying contractors and SHOULD offer tokens which are valid for a larger amount of requests and MAY time out.

This is the prefered method for link aggregators and search engines, which make money from referencing third party content. It can also be used, if the referencing page owner want to avoid payment hussle for the customer.

2.2.2. Pay per use

The RIGHT element MAY have a couple of attributes, which instruct the browser to process the necessary payment before accessing the resource.

The attribute "payment" contains a URI [2] denoting the clearing point for the transaction and the destination of the payment. This memo does not define any methods, but it might look like "microico:123456..def" or "https://micro.pay.me.example/@company/AxelS". The payment API MUST return a proof of payment (PoP) value on success. The PoP value MUST NOT exceed the Base64 charset [4].

The attribute "currency" contains a string to be used by the payment API. It SHOULD donate a well defined abbreviation for the currency.

The attribute "view" contains a numerical value. The browser MUST NOT render the RIGHT element, without successfully paying the denoted amount of currency via the payment API. It SHOULD cache this result for later use to avoid multiple spendings for the same content.

The attribute "click" contains a numerical value. The browser MUST add the a header line "Right: click=PoP" when requesting the referenced resource. The PoP is the proof of payment value from payment of the denoted amount of currency. The resource provider MAY use this value to validate, that the resource was payed. If the token is invalid, it MAY respond with the error code 402. It MUST NOT respond with error code 451 [7].

At least one of the attributes "view" or "click", as well as the attributes "payment" and "currency" MUST be present for this method.

This is the prefered method for referencing restricted content from pages providing own content.

2.3. Digital Rights Management

The RIGHT element MAY have an attribute named "drm", which contains an opaque token. The token SHOULD be a Base64 string [4]. The attribute MUST NOT processed, if the token exceeds the Base64 charset. It MAY even check, that the token is really a Base64 encoding.

Any valid token MUST be handed over to the local DRM software used to process the content of the resource. The details of the API and the processing inside the DRM software is out of the scope of this memo.

3. Compensate transit providers

3.1. Routing Considerations

Traffic from the resource provider to the client (and back) travels through the Internet by passing from one internet carrier to the next one until it reaches the destination. The internet carriers are interconnected by each other through dedicated peerings. At such a peering, the networks of the carriers talk directly to each other. The network of a carrier itself are summarized by an Autonomous System Number [3].

There is no guarantee, that the packets travel the same way all the time. Traffic in one direction may touch completely different providers, than on the way back. The traffic can be rerouted if necessary, even if the TCP session is still up. So it is difficult to compensate the intermediate carriers, simply because they may change at any time.

3.2. Option Format

In order to track the route of carriers involved, a new TCP option is defined. It contains an arbitrary amount of 32 bit ASN / Payload pairs.

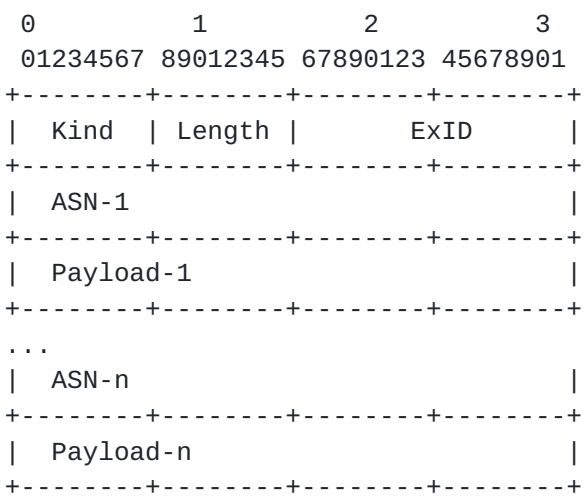


Figure 1: Autonomous System Compensation Option

Kind: The option kind value is 253.

Length: The length of the option is variable, based on the required size of the content. The size will be a multiple of 4.

ExID: The experiment ID value is 0x0a0d (2573).

ASN: 32 bit value of the Autonomous System Number.

Payload: A 32 bit opaque value.

The option space in the TCP header is limited to eleven 32 bit words [1]. So no more than five ASN / Payload pairs can be included. The number might be lower, if other TCP options are present.

The option is defined to exist only in packets with the SYN flag set. It SHOULD NOT occur in data only packets, hence the MSS is not changed. For TCP fast open [6], the size of the initial segment needs to be adjusted.

3.3. Offering services

In order request a resource according to Section 2.1, the client opens a new TCP connection with the SYN flag set and the ACK flag cleared [1] and SHOULD add an empty ASN option as defined in Section 3.2.

Any ASN MAY offer a special service to the content provider by appending its own ASN to the end. The payload contains a contractually defined value, i.e. a challenge with nonce bits, which will be processed by the content provider. The list of offers MUST NOT be deleted or reordered.

If there is no contract between the carrier and the content provider, the special payload "0" MAY be used. This means, that the carrier want to negotiate a contract. If this negotiation fails after a reasonable period of time, the carrier SHOULD pass the packets untouched.

A carrier MUST NOT add an offer to the list, if it can not guarantee, that all packets of the flow will run through its infrastructure. Normally only the Internet access provider is able to do so. Transit providers need to take extra actions to bypass the normal Internet routing, before adding an offer. Adding an offer includes the promise to keep the routing decision stable and always route the following packets of this flow to the same ASN as the initial packet. Furthermore it MUST route all the response packets of this flow to the ASN which was last one in the list.

If the option space is full, the carrier MUST NOT add an offer to the list. This way the access providers have a first opportunity to place an offer, fulfilling their request to compensate the broadband access costs.

3.4. Accepting offers

Any new connection containing this ASN option, SHOULD be signalled to the application level. Processing of any of the payment headers as defined in Section 2.2 SHOULD be suppressed unless the application got this signal. This way normal "links" are processed as usual, while "rights" can be handled correctly.

On receiving the initial packet at the final destination, the option values are examined. For each offer the payload MUST be replaced by the contractually defined, computed response. The list MUST NOT be reordered. If an offer is rejected, the payload is set to "0". So the TCP syn/ack packet contains a ASN option with all the acceptance values.

On the way back each ASN, which put in an offer, MUST examine the option, and MUST remove the last item from the list, if AS number matches. Depending on the response to the offer, the TCP flow SHOULD be handled accordingly to the contractual requirements.

Finally the carrier SHOULD route toward the next ASN in the option.

4. Acknowledgements

This memo is influenced by the legislative process in the EU [11]. Special thanks go to Julia Reda [12] for keeping the public updated. The basic idea was contributed by Bernd Paysan. Very valuable input came from many discussions over the IETF lists.

5. IANA Considerations

This memo adds an TCP ExID into the IANA registry <https://www.iana.org/assignments/tcp-parameters/tcp-parameters.xhtml#tcp-exids> according the the rules of RFC 6994 [5].

Value	Description
0x0a0d	Autonomous System Compensation

6. Security Considerations

Filtering the TCP option on intermediate devices might render the resource in question unreachable.

The TCP option is designed to implement a challenge response mechanism, which should withstand a MITM attack. All details of such a mechanism are out of the scope of this memo.

Attribute values might be copied from a document and reused elsewhere. This might result in theft of access rights and should be prevented by appropriate actions (i.e. checking Referer, Cookies).

7. References

7.1. Normative References

[1] Postel, J., "Transmission Control Protocol", STD 7, RFC 793, DOI 10.17487/RFC0793, September 1981, <https://www.rfc-editor.org/info/rfc793>.

[2] Berners-Lee, T., Fielding, R., and L. Masinter, "Uniform Resource Identifier (URI): Generic Syntax", STD 66, RFC 3986, DOI 10.17487/RFC3986, January 2005, <https://www.rfc-editor.org/info/rfc3986>.

[3] Rekhter, Y., Ed., Li, T., Ed., and S. Hares, Ed., "A Border Gateway Protocol 4 (BGP-4)", RFC 4271, DOI 10.17487/RFC4271, January 2006, <https://www.rfc-editor.org/info/rfc4271>.

[4] Josefsson, S., "The Base16, Base32, and Base64 Data Encodings", RFC 4648, DOI 10.17487/RFC4648, October 2006, <https://www.rfc-editor.org/info/rfc4648>.

[5] Touch, J., "Shared Use of Experimental TCP Options", RFC 6994, DOI 10.17487/RFC6994, August 2013, <https://www.rfc-editor.org/info/rfc6994>.

[6] Cheng, Y., Chu, J., Radhakrishnan, S., and A. Jain, "TCP Fast Open", RFC 7413, DOI 10.17487/RFC7413, December 2014, <https://www.rfc-editor.org/info/rfc7413>.

[7] Bray, T., "An HTTP Status Code to Report Legal Obstacles", RFC 7725, DOI 10.17487/RFC7725, February 2016, <https://www.rfc-editor.org/info/rfc7725>.

[8] World Wide Web Consortium, "The link element", 2018, <https://w3c.github.io/html/document-metadata.html#the-link-element>.

[9] World Wide Web Consortium, "The a element", 2018, <https://w3c.github.io/html/textlevel-semantics.html#the-a-element>.

7.2. Informative References

[10] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, DOI 10.17487/RFC2119, March 1997, <https://www.rfc-editor.org/info/rfc2119>.

[11] EUROPEAN COMMISSION, "Proposal for a DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on copyright in the Digital Single Market", 2016, <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52016PC0593>.

[12] Reda, J., "Homepage", <https://juliareda.eu/>.

[13] Helgadottir, A., "German press track record", <https://threadreaderapp.com/thread/1102551306525384704.html>.

[14] Marx, K., "Kritik des Gothaer Programms", 1875.

Author's Address

Lutz Donnerhacke
Fitug e.V.
Leutragraben 1
Jena 07743
DE

Phone: +49 3641 573561
Email: lutz@fitug.de