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Activity Streams Concepts and Representations (Draft) json-activity-01

Status of this Memo

Abstract

This document presents an extension that allows activities on social objects to be expressed within the Atom Syndication Format.

Requirements Language

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in **[RFC2119]**.

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1. Introduction

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...

It is a goal of this specification to provide sufficient metadata about an activity such that a consumer of the data can present it to a user in a rich human-friendly format. This may include constructing readable sentences about the activity that occurred, visual representations of the activity, or combining similar activities for display.

2. Notational Conventions

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This specification allows the use of IRIs **[RFC3987]**. Every URI **[RFC3986]** is also an IRI, so a URI may be used wherever an IRI is named. When an IRI that is not also a URI is given for dereferencing, it MUST be mapped to a URI using the steps in Section 3.1 of **[RFC3987]**. When an IRI is serving as an identifier, it MUST NOT be so mapped.

The text of this specification provides the sole definition of conformance. Examples in this specification are non-normative.

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3. Activity Concepts

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In its simplest form, an activity consists of an actor, a verb, and an object. It tells the story of a person performing an action on or with an object -- "Geraldine posted a photo" or "John shared a video". In most cases these components will be explicitly declared, but they may also be implied.

3.1. The Activity Construct

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An activity consists of the following logical components:

3.1.1. Icon

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This URI value identifies an image resource which provides a visual representation of the activity, intended for human consumption. The image SHOULD be square and SHOULD be suitable for presentation at a small size. An Activity construct MAY have an icon but it MUST NOT have more than one.

3.1.2. Time

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A Date Construct that identifies the time at which the activity occurred. It is important to note that this is not necessarily the same as the time at which the activity was published. An Activity construct MUST have exactly one Time value.

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3.1.3. Actor

An **Object Construct** that identifies the entity that performed the activity. An Activity construct MUST have exactly one actor.

3.1.4. Verb

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An absolute URI value that identifies the action of the activity. An Activity construct MUST have one or more verbs.

If an activity contains more than one verb, all verbs MUST be generalizations or specializations of one another. For example, the general verb "to experience" might be specialized by a verb "to listen to". If a more specific verb is used, publishers SHOULD also include all of its more general verbs so that a consumer may use the most specific verb it understands.

An activity consumer SHOULD use the most specific verb it understands within each entry. If none of the activity's verbs are understood by the consumer, it MAY use other information to infer the verb, or the consumer MAY use the content of the activity title, summary and/or content to obtain a human-readable description of the activity.

3.1.5. Object

TOC

This **Object Construct** identifies the primary object of the activity. An Activity construct MUST have exactly one object.

3.1.6. Target

TOC

The target of an activity is an **Object Construct** that represents the object to which the activity was performed. The exact meaning of an activity's target is dependent on the verb of the activity, but will often be the object of the English preposition "to". For example, in the activity "John saved a movie to his wishlist", the target of the activity is 'wishlist'. The activity target MUST NOT be used to identify an indirect object that is not a target of the activity. An Activity construct MAY have a target but it MUST NOT have more than one.

3.1.7. Generator

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The generator of an activity is an **Object Construct** that represents the application which created it, which may be separate from the service to which the activity is published. For example, a third-party application on a mobile phone may be used to post a photo to a photo sharing service. An Activity construct MAY have a generator but it MUST NOT have more than one.

3.1.8. Service Provider

TOC

The service provider of an activity is an **Object Construct** that represents the service which is publishing the activity. An Activity Construct MAY have a provider but it MUST NOT have more than one.

3.1.9. Title

TOC

An HTML representation of the natural language title for this activity. Consumers MAY use the value of this field, if set, as a fallback for when none of the provided verbs are recognized. An Activity Construct MAY have a title but it MUST NOT have more than one.

3.1.10. Body

TOC

An HTML representation of a natural language describing this activity including visual elements such as thumbnails. Consumers MAY use the value of this field, if set, as a fallback for when none of the provided verbs are recognized. An Activity Construct MAY have a body but it MUST NOT have more than one.

3.1.11. Standard Link

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A Link as defined by section 3 of **[draft-nottingham-http-link-header-10]**. An Activity Construct MAY have one ore more Standard Links.

This component is provided to allow the use of the registry of link relations defined by the Web Linking specification to create links between an Activity Construct and other resources. The Context of the Link is the Object Construct. This component MUST NOT be used to publish data that matches a meaning that could be published by another Activity Streams component.

3.2. The Object Construct

TOC

An object construct is a thing, real or imaginary, which participates in an activity. It may be the entity performing the activity, or the entity on which the activity was performed. An object consists of the logical components defined in the following sections. Certain object types may further refine the meaning of these components, or they may define additional components. If an object type defines an additional component then it SHOULD also define the representation of that component in one or more serialization formats.

3.2.1. ID

TOC

The id of an object construct is an absolute URI that uniquely identifies the object. An Object construct SHOULD have exactly one ID value. If an object construct does not have an ID value consumers MAY use the Permalink URL as a weaker identifier, but must in this case allow for the fact that Permalink URL is not defined to be unique across all objects and be prepared to handle duplicates.

3.2.2. Name

TOC

This string value provides a human readable display name for the object, if the object has a name. An Object construct MAY have a name, but MUST NOT have more than

one.

3.2.3. Summary

TOC

This string value provides a human readable description or summary of the Object. An Object construct MAY have a summary, but MUST NOT have more than one.

3.2.4. Representative Image

TOC

A **Media Link Construct** that identifies an image resource which provides a visual representation of the object, intended for human consumption. An Object construct MAY have a representative image, but MUST NOT have more than one.

3.2.5. Permalink URL

TOC

This URI value identifies a resource which provides an HTML representation of the object. An Object construct MAY have a Permalink URL, but MUST NOT have more than one. The presence of this construct implies a Link as defined in section 3 of **[draft-nottingham-http-link-header-10]** whose Context is this Object Construct, whose Link Relation Type is "alternate" and whose Target IRI is the Permalink URL value.

3.2.6. Object Type

TOC

This absolute URI identifies the type of object. An Object construct MAY have one or more types.

If an object contains more than one object type, all types MUST be generalizations or specializations of one another. For example, the general type "article" might be specialized by the type "weblog entry". If a more specific type is used, publishers SHOULD also include all of its more general types so that a consumer may use the most specific type it understands.

Activity consumers SHOULD use the most specific object type that they understand within each entry. The consumer MAY use other information to infer the object type if it does not recognize any of the object types given. If it cannot infer the object type, a consumer MUST act as though no object type is present.

If no object type is present, the object has no specific type. Consumers SHOULD refer to such objects only by their names. For example, when forming an activity sentence a consumer might say "Johan posted 'My Cat'" rather than "Johan posted a photo: 'My Cat'".

3.2.7. In Reply To Object

TOC

An **Object Construct** that this object is a response to. An Object Construct MAY have one In Reply To Object, but MUST NOT have more than one.

This is not set unless the Object Construct is a response to another Object Construct.

3.2.8. Attached Object

TOC

An **Object Construct** that is attached to this object. An Object Construct MAY have one or more attached objects.

An attached Object Construct can be used when one object is used as a wrapper or carrier for another object, similar to the concept of attached files in an email message.

3.2.9. Reply Object

TOC

An **Object Construct** that has this Object Construct as its In Reply To Object. An Object Construct MAY have one more more Reply Objects.

In many cases a specific publication of an object will include only a selection of the full set of objects posted as replies to this object. Publishers MAY choose any subset of the set of all reply objects to include. Publishers MAY make available a complete list of reply objects for a particular object via a separate mechanism, but that mechanism is not defined by this specification.

3.2.10. Reaction Activity

TOC

An **Activity Construct** that describes an Activity whose Object is this Object Construct. An Object Construct MAY have one or more Reaction Activities.

In many cases a specific publication of an object will include only a selection of the full set of activities that are reactions to this object. Publishers MAY choose any subset of the set of all reaction activities to include. Publishers MAY make available a complete list of reaction activities for a particular object via a separate mechanism, but that mechanism is not defined by this specification.

3.2.11. Action Link

TOC

An **Action Link** that represents an action that a human could peform on this object. An Object Construct MAY have one or more Action Links.

3.2.12. Upstream Duplicate ID

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A string containing the ID value of another Object Construct for which this Object Construct is a duplicate created by re-publishing. An Object Construct MAY have one or more Upstream Duplicate IDs.

A publisher SHOULD use this component if it is knowingly duplicating with a new ID the content from an Object Construct that was obtained elsewhere. This MAY be used as a hint for consumers to use when resolving duplicates between objects recieved from different sources.

3.2.13. Downstream Duplicate ID

TOC

A string containing the ID value of another Object Construct for which was created as a duplicate of this Object Construct. An Object Construct MAY have one or more Downstream Duplicate IDs.

A publisher SHOULD use this component if has knowingly created another Object Construct with a new ID, possibly in another system, that duplicates the content in this object. A publisher might choose to do this in order to make the content available to a wider audience. This MAY be used as a hint for consumers to use when resolving duplicates between objects recieved from different sources.

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3.2.14. Standard Link

A Link as defined by section 3 of **[draft-nottingham-http-link-header-10]**. An Object Construct MAY have one ore more Standard Links.

This component is provided to allow the use of the registry of link relations defined by the Web Linking specification to create links between an Object Construct and other resources. The Context of the Link is the Object Construct. This component MUST NOT be used to publish data that matches a meaning that could be published by another Activity Streams component.

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3.3. The Media Link Construct

A Media Link Construct represents a hyperlink to a media item. TODO: elaborate

A Media Link Construct consists of the logical components defined in the following sections.

TOC

3.3.1. Target URL

The URL that is the target of this hyperlink. A Media Link Construct MUST have one Target URL and MUST NOT have more than one.

TOC

3.3.2. Media Type

A hint to the consumer about the media type of the target resource. The value of this component is a media type as defined in [TODO: reference and xref]. A Link Construct MAY have one Media Type but MUST NOT have more than one.

TOC

3.3.3. Width

A hint to the consumer about the natural width of the resource that is the target of this hyperlink, in pixels. This MAY be included when the target resource is a visual media item such as an image, video or embeddable HTML page, but a Link Construct MUST NOT have more than one Width.

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3.3.4. Height

A hint to the consumer about the natural height of the resource that is the target of this hyperlink, in pixels. This MAY be included when the target resource is a visual media item such as an image, video or embeddable HTML page, but a Link Construct MUST NOT have more than one Height.

TOC

3.3.5. Duration

A hint to the consumer about the length of the resource that is the target of this hyperlink, in seconds. This MAY be included when the target resource is a time-based media item such as an audio or video, but a Link Construct MUST NOT have more than one Duration.

TOC

3.4. The Action Link Construct

An Action Link Construct represents a hyperlink at which an action can be performed. TODO: elaborate

An Action Link Construct consists of the logical components defined in the following sections.

TOC

3.4.1. Target URL

The URL that is the target of this hyperlink. An Action Link Construct MUST have one Target URL and MUST NOT have more than one.

TOC

3.4.2. Caption

The human-readable caption of the UI element that a user will interact with in order to navigate to the Target URL. An Action Link Construct MUST have one Caption and MUST NOT have more than one.

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4. JSON Representation

An Activity Construct can be represented with the JSON format, as defined in **[RFC4627]**, using the object structures defined in the following subsections. This object model MAY be applied to other serialization formats with a similar data model to JSON.

In order to avoid confusion with the Object Construct concept in the Activity Streams data model, in this section the term "dictionary" will be used to refer to the JSON object data type.

In the JSON dictionary structures defined in the following subsections, absent components may be represented either by an explicit declaration of the property whose value is null or by omitting the property declaration altogether at the option of the publisher; these two representations are semantically equivalent. If a property is having a value whose type is a JSON array, the absense of any items in that array MUST be represented by omitting the property entirely or publishing it with the value null, and MUST NOT be represented as an empty array, except as otherwise stated in the definition of a specific property.

4.1. Activity Construct represented as JSON object

TOC

An Activity Construct is represented in JSON as a JSON dictionary. The primary representation of an Activity Construct in JSON is a Full Activity Dictionary as described in **Section 4.1.1**.

4.1.1. Full Activity Dictionary

TOC

The components of the Activity Construct are represented in this JSON as follows:

Actor
: The **Actor** of the Activity Construct is represented by a property named `actor` whose value is a JSON dictionary as described in **Section 4.2**.

Object
: The **Object** of the Activity Construct is represented by a property named `object` whose value is a JSON dictionary as described in **Section 4.2**.

Target
: The **Target** of the Activity Construct is represented by a property named `target` whose value is a JSON dictionary as described in **Section 4.2**.

Verb
: The set of **verbs** of the Activity Construct is represented by a property named `verbs` whose value is a JSON array of JSON string values containing the verb URIs.

Time
: The **Time** of the Activity Construct is represented by a property named `postedTime` whose value is a JSON string containing a timestamp in W3CDTF format as described in [TODO: xref W3CDTF spec].

Generator
: The **Generator** of the Activity Construct is represented by a property named `generator` whose value is a JSON dictionary as described in **Section 4.2**.

Service Provider
: The **Service Provider** of the Activity Construct is represented by a property named `provider` whose value is a JSON dictionary as described in **Section 4.2**.

Title
: The **Title** of the Activity Construct is represented by a property named `title` whose value is a JSON string containing the title value. This string MUST be a HTML fragment that would be valid in an inline context as described in [TODO: what can we reference for this definition?].

Body
: The **Body** of the Activity Construct is represented by a property named `body` whose value is a JSON string containing the body value. This string MUST be a HTML fragment that would be valid in a block context as described in [TODO: what can we reference for this definition?].

Standard Link
: The set of **Standard Links** of the Activity Construct is represented as described in **Section 4.3.2**.

4.1.2. Activity Dictionary with Implied Object

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The components of the Activity Construct are represented in JSON as defined in **Section 4.1.1** except for the following exception:

Object
: The Object Component is not explicitly represented inside the JSON dictionary, and is instead implied by context. The contextual object is defined as part of the definition of any property which uses this representation for its value.

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4.2. Object Construct represented as JSON dictionary

An Object Construct is represented in JSON as a JSON dictionary. The primary representation of an Object Construct is a Full Object Dictionary as defined in **Section 4.2.1**.

TOC

4.2.1. Full Object Dictionary

The components of the Object Construct are represented in this dictionary as follows:

ID
: The **ID** of the Object Construct is represented by a property named `id` whose value is a JSON string containing the ID.

Name
: The **name** of the Object Construct is represented by a property named `displayName` whose value is a JSON string containing the name.

Summary
: The **summary** of the Object Construct is represented by a property called `summary` whose value is a JSON string containing the summary.

Representative Image
: The **representative image** of the Object Construct is represented by a property called `image` whose value is a JSON dictionary as defined in **Section 4.3.1**.

Permalink URL
: The **permalink URL** of the Object Construct is represented by a property named `link` whose value is a JSON string containing the permalink URL.

Object Type
: The set of **object type URLs** of the Object Construct is represented by a property named `objectTypes` whose value is a JSON array of JSON string values containing the object type URIs.

In Reply To Object
: The **In Reply To Object** of the Object Construct is represented by a property called `inReplyTo` whose value is a JSON dictionary as described in **Section 4.2**.

Reply Object
: The set of **Reply Objects** that the publisher choses to include for this object is represented by a property named `replies` whose value is a JSON array of JSON objects of the form defined in **Section 4.2.2**, where the implied In Reply To Object is the Object Construct represented by the JSON object which contains this `replies` property.

Reaction Activity
: The set of **Reaction Activities** that the publisher choses to include for this object is represented by a property named `reactions` whose value is a JSON array of JSON objects of the form defined in **Section 4.1.2**, where the implied Object is the Object Construct represented by the JSON object which contains this `replies` property.

Attached Object
: Thee set of **Attached Objects** of the Object Construct is represented by a property called `attachedObjects` whose value is a JSON array of JSON dictionaries as described in **Section 4.2**.

Upstream Duplicate ID

The set of **Upstream Duplicate IDs** of the Object Construct is represented by a property named `upstreamDuplicates` whose value is a JSON array of JSON string values containing the ID URIs.

Downstream Duplicate ID
: The set of **Downstream Duplicate IDs** of the Object Construct is represented by a property named `downstreamDuplicates` whose value is a JSON array of JSON string values containing the ID URIs.

Standard Link
: The set of **Standard Links** of the Activity Construct is represented as described in **Section 4.3.2**.

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4.2.2. Object Dictionary with Implied In Reply To Object

The components of the Object Construct are represented in JSON as defined in **Section 4.2.1** except for the following exception:

In Reply To Object
: The In Reply To Object Component is not explicitly represented inside the JSON dictionary, and is instead implied by context. The contextual object is defined as part of the definition of any property which uses this representation for its value.

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4.3. Other Representations

[TODO: write something here]

TOC

4.3.1. Media Link Construct represented as JSON dictionary

The components of a Media Link Construct is represented by a JSON dictionary as follows:

Target URL
: Represented by the `url` property of the JSON dictionary.

Width
: Represented by the `width` property of the JSON dictionary.

Height
: Represented by the `height` property of the JSON dictionary.

Duration
: Represented by the `duration` property of the JSON dictionary.

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4.3.2. Set of Standard Links represented as JSON dictionary

The set of Standard Link components of both an Activity Construct and an Object Construct are represented by a JSON dictionary whose properties are named for Link Relation Types as defined in **[draft-nottingham-http-link-header-10]**. Valid Link Relation Types and their meanings are defined in the Link Relation Type registry created by that specification. A particular property MUST NOT be included unless there is at least one link in the set with the corresponding Link Relation Type.

The value of each of the properties is a JSON array containing a JSON object for each Link in the set with the corresponding Link Relation Type. containing a property `href` whose value is a JSON string containing the Target URI of the link it represents. Target

Attributes of the Link are represented by additional properties whose names correspond to Target Attributes defined for the link, where the value of each is a JSON string containing the value of the corresponding Target Attribute.

4.4. Stream of Activity Constructs represented as a JSON Document

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The above defined JSON dictionary formats can be used to represent the Activity Streams concepts in any JSON context. This section defines one particular use of the above dictionary formats to publish a JSON document that represents a set of Activity Constructs.

Publishers using this format MUST produce a valid JSON document whose root value is a JSON object. This document MUST include a property named `items` whose value is a JSON array of JSON dictionaries of the form described in **Section 4.1.1**. Other properties MAY be included in the root JSON object, but the meaning of these properties is not defined by this specification.

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5. The "Post" Verb

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This specificiation defines one initial verb and defers to other specifications to define the full schema of verb and object types as defined in **Section 6**.

The "Post" verb describes the act of authoring an object and then publishing it online. The verb URI for the "Post" verb is `http://activitystrea.ms/schema/1.0/post`.

The actor of an Activity Construct using the "Post" verb is an Object Construct representing the person or object that authored and posted the item represented by the object of the Activity Construct.

The target of the Activity Construct, if present, represents the item into which the object is posted. For example, this could represent a blog that the author has posted in.

It is not appropriate to use the target of the Activity Construct to represent an Object Construct that this new Object Construct is posted in reply to. Instead, this SHOULD be represented as the In Reply To Object component of the new object.

5.1. Implied "Post" Activity

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Because the "Post" Verb is defined to includ ethe act of publishing an object online, it is possible to assume an implied "Post" activity for any Object Construct even if such an activity was never explicitly published or recieved. The components of this implied activity are as follows; any component not explicitly listed here is absent from the resulting activity unless the consumer is able to infer a value based on out-of-band information outside the scope of this specification:

Actor
: The **Actor** of the Activity Construct is unknown unless the consumer is able to infer an actor based on information outside the scope of this specification. For example, the consumer may know via some out-of-band information that all of the objects in a particular document were posted by a particular user.

Object
: The **Object** of the Activity Construct is the object for which this implied activity is being constructed.

Verb
: The Activity Construct has the "Post" verb as defined in **Section 5** as its only

Verb.

Time

The **Time** of the Activity Construct is unknown unless the consumer is able to infer a time based on an extension property defined for the Object Construct's Object Type that is defined to be the time the object was created and/or posted online.

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6. Extension Object Types and Verbs

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Other specifications MAY define new object types and verbs for use with the concepts and serializations defined in this specification.

When defining a new verb, the defining specification MUST provide a verb identifier URI for the new verb and MUST define the meaning of the verb in terms of the Actor, Object and Target components of the Activity Construct, and MUST define whether a Target is required and what it represents when present.

When defining a new object type, the defining specification MUST provide an object type identifier URI for the new object type. The definition of the new object type MAY define additional components specific to that object type; if so, the specification SHOULD define how these additional components are to be represented as JSON properties, and the specification MAY define how these additional components are to be represented in other serialization formats. The definition of the new object type MAY impose additional meaning or constraint on the core Object Construct components as long as the new definition remains compatible with the definition of the base component. New Object Construct components SHOULD be defined such that the object would remain useful if those components are omitted or removed during processing, to enable graceful fallback by consumers that do not implement the extension components or alternative representations that are unable to represent the extensions.

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7. Other Representations

TOC

This specification defines the primary representation for the Activity Streams concepts in terms of the JSON serialization format. Other specifications MAY define additional representations of the Activity Streams concepts. If the new representation is compatible with the JSON data model, the new representation SHOULD be defined as a transformation of the raw JSON structures. Otherwise, the new representation MAY be defined in terms of the Activity Streams concepts in **Section 3**.

Defining a new representation as a transformation from JSON will allow the new representation to automatically support additional components added for new object types as described in **Section 6**. Otherwise the representation of these new components must be defined on a case-by-case basis.

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8. Requirements for Re-publishers

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A Re-publisher is an agent which receives Activity Constructs or Object Constructs and then transmits these items to other agents.

When a Re-publisher transmits an Activity Construct, the Re-publisher MUST preserve the original Verb and Posted Time components, MUST re-publish the Actor, Object and Target components as defined in the previous paragraph. The Re-publisher MAY preserve the remaining properties, OR the Re-publisher MAY omit these properties entirely or replace these properties with locally-determined values.

When a Re-publisher transmits an Object Construct, the Re-publisher MUST maintain the full integrity of the Object Construct, including any extension properties, and retain the original ID value OR, if maintaining full fidelity is not possible the Re-publisher MUST assign this copy a new ID and include the ID of the original object as a value of the Upstream Duplicates component of the new copy. In the latter case, a new Object Construct is created which is considered to be a duplicate of the original Object Construct.

9. Security Considerations

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Publishers or Consumers implementing Activity Streams as a stream of public data may also want to consider the potential for unsolicited commercial or malicious content and should take preventative measures to recognize such content and either identify it or not include it in their stream implementations.

Publishers should take reasonable measures to make sure potentially malicious user input such as cross-site scripting attacks are not included in the Activity Streams data they publish.

Consumers that re-emit ingested content to end-users MUST take reasonable measures if emitting ingested content to make sure potentially malicious ingested input is not re-emitted.

Consumers that re-emit ingested content for crawling by search engines should take reasonable measures to limit any use of their site as a Search Engine Optimization loophole. This may include converting un-trusted hyperlinks to text or including a rel="nofollow" attribute.

10. IANA Considerations

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None.

11. Normative References

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[RFC2119]	Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels," March 1997.
[RFC3986]	Berners-Lee, T., Fielding, R., and L. Masinter, "Uniform Resource Identifiers (URI): Generic Syntax," January 2005.
[RFC3987]	Duerst, M. and M. Suignard, "Internationalized Resource Identifiers (IRIs)," January 2005.
[RFC4627]	Crockford, D., "The application/json Media Type for JavaScript Object Notation (JSON)," July 2006.
[draft-nottingham-http-link-header-10]	Nottingham, M., "Web Linking," May 2010.

Appendix A. Acknowledgements

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