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**JavaScript Object Notation (JSON) Text Sequences**  
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Abstract

This document describes the JSON text sequence format and associated media type.

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## **1. Introduction and Motivation**

The JavaScript Object Notation (JSON) [[RFC7159](#)] is a very handy serialization format. However, when serializing a large sequence of values as an array, or a possibly indeterminate-length or never-ending sequence of values, JSON becomes difficult to work with.

Consider a sequence of one million values, each possibly 1 kilobyte when encoded, which would be roughly one gigabyte. If processing such a dataset requires first parsing it entirely, then the result is very inefficient and the processing will be limited by virtual memory. "Online" (a.k.a., "streaming") parsers help, but they are neither widely available or widely used, nor are they easy to use.

Ideally such datasets could be parsed and processed one element at a time. Even if each element must be parsed in a not-online manner due to local choice of parser, the result will usually be sufficiently online: limited by the size of the biggest element in the sequence rather than by the size of the sequence.

This document describes the concept and format of "JSON text sequences", which are specifically not JSON texts themselves but are composed of JSON texts.

### **1.1. Conventions used in this document**

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](#)].



## 2. JSON Text Sequence Format

The ABNF [[RFC5234](#)] for the JSON text sequence format is as follows:

```
JSON-sequence = *(JSON-text 1*(ws))  
ws = %x20 / %x09 / %x0A / %x0D  
JSON-text = <given by RFC7159>
```

Figure 1: JSON text sequence ABNF

A JSON text sequence is a sequence of JSON texts, each followed by JSON whitespace (see the 'ws' rule in the JSON ABNF) separator.

Requirements:

- o JSON text sequence encoders MUST emit one or more JSON whitespace separator characters immediately after any JSON text.
- o JSON text sequence parsers MUST NOT interpret any sequence of two or more contiguous whitespace as a sequence of empty JSON texts. Two contiguous separators do not denote an empty JSON text between them as there is no such thing as an empty JSON text.

An input of 'truefalse' is not a valid sequence of two JSON values, true and false! Neither is 'true0' a valid sequence of true and zero. Some existing JSON parsers that might be used to construct sequence parsers might in fact accept such sequences, erroneous parsing when of sequences of two or more numbers. E.g., a sequence of two numbers, 4 and 2, encoded without the required whitespace between them would parse incorrectly as the number 42. This ambiguity is resolved by requiring that encoders never omit the separator.



### **3. Security Considerations**

All the security considerations of JSON [[RFC7159](#)] apply.

There is no end of sequence indicator. This means that "end of file", "end of transmission", and so on, can be indistinguishable from a logical end of sequence. Applications where this matters should denote end of sequence by convention (e.g., Content-Length in HTTP).

JSON text sequence parsers based on non-incremental, non-online JSON text parsers will not be able to efficiently parse JSON texts in which newlines appear; attempting to parse such sequences with non-incremental, non-online JSON text parsers creates a compute resource exhaustion vulnerability.

The first requirement given in [Section 2](#) (otherwise-ambiguous JSON texts must be separated by whitespace) is critical and must be adhered to. It is best to always emit a whitespace separator after every JSON text emitted.





#### **4. IANA Considerations**

The MIME media type for JSON text sequences is application/json-seq.

Type name: application

Subtype name: json-seq

Required parameters: n/a

Optional parameters: n/a

Encoding considerations: binary

Security considerations: See <this document, once published>, [Section 3](#).

Interoperability considerations: Described herein.

Published specification: <this document, once published>.

Applications that use this media type: JSON text sequences have been used in applications written with the jq programming language.



## **5. Normative References**

- [RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", [BCP 14](#), [RFC 2119](#), March 1997.
- [RFC5234] Crocker, D. and P. Overell, "Augmented BNF for Syntax Specifications: ABNF", STD 68, [RFC 5234](#), January 2008.
- [RFC7159] Bray, T., "The JavaScript Object Notation (JSON) Data Interchange Format", [RFC 7159](#), March 2014.

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