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RIFT Keys Structure and Well-Known Registry in Key Value TIE

Abstract

Routing in Fat-Trees [RIFT](#) [[RIFT](#)] allows for key/value pairs to be advertised within Key-Value Topology Information Elements (KV TIEs). The data contained within these KV TIEs can be used for any imaginable purpose. This document defines the various Key Types (i.e. Well-Known, OUI, and Experimental) and a method to structure corresponding values.

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 [RFC 2119](#) [[RFC2119](#)].

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1. Description

Routing in Fat-Trees ([RIFT](#) [[RIFT](#)]) allows for key/value pairs to be advertised within Key-Value Topology Information Elements (KV TIEs). There are no restrictions placed on the type of data that is contained in KV TIEs nor what the data is used for. It could contain a simple string or even Thrift encoded data. However, the KV elements SHOULD NOT be used to carry topology information used by RIFT itself to perform distributed computations.

This document defines a Key Type Registry to maintain Well-Known and vendor specific Key Types in order to simplify interoperability between implementations and eliminate the risk of collision for future implementations. An Experimental Key Type is additionally defined.

2. Key-Value Pair Structure

[Figure 1](#) illustrates the generic Key-Value Pair structure.

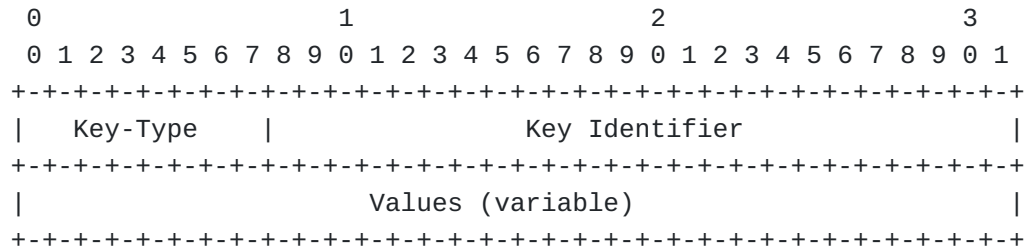


Figure 1: Generic Key-Value Structure

where:

Key-Type:

A 1-byte value that identifies the Key Type. It MUST be a reserved value from the Key Value Type Registry that is defined later in this document.

Key Identifier:

A 3-byte value that identifies the specific Key and describes the structure of the contained values.

Values:

A variable length value that contains data associated with the Key. It SHOULD contain 1 or more elements. Whether the collection of elements allows duplicates and/or is ordered is governed by the particular key identifier.

2.1. Well-Known Key Type

This section reserves a value in the Key Type Registry to indicate Well-Known Key Types that all implementations SHOULD support.

As shown in [Figure 2](#), the Key-Type will be used to identify that the Key Type is Well-Known. The Key Identifier will be used to identify the specific Key and describe the structure of the contained values.

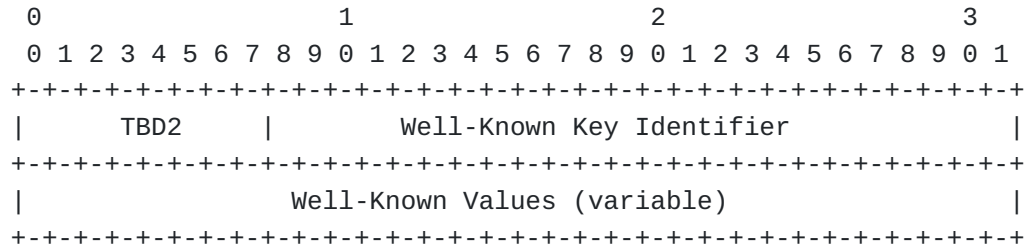


Figure 2: Well-Known Key Type

2.2. OUI Key Type

This section reserves a value in the Key Type Registry to indicate an OUI (vendor-specific) Key Type that any implementation MAY support.

As shown in [Figure 3](#), the Key-Type will be used to identify the Key Type as OUI. The Key Identifier MUST use an organization's reserved OUI space to indicate the Key and value structure.

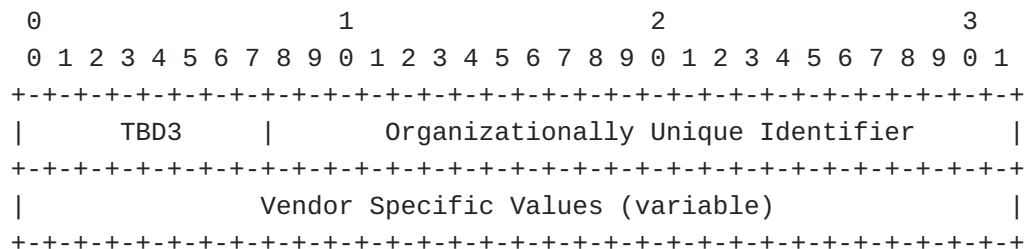


Figure 3: OUI Key Type

2.3. Experimental Key Type

This section reserves a value in the Key Type Registry to indicate an Experimental Key Type.

As shown in [Figure 4](#), the Key-Type will be used to identify the Key Type as Experimental. The Key Identifier will be used to identify the specific experimental Key and describe the structure of the contained values.

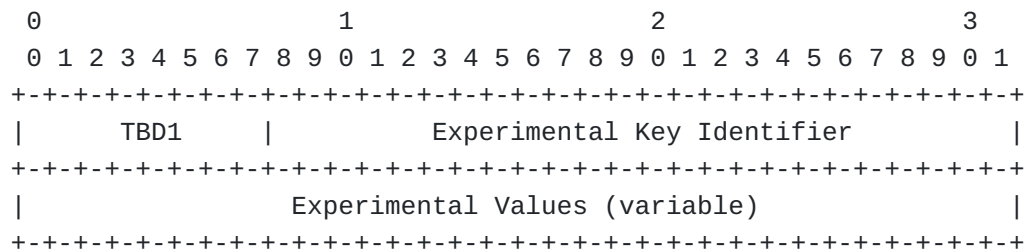


Figure 4: Experimental Key Type

3. IANA Considerations

This section requests that IANA help govern Key Types via the usual IANA registry procedures as per [\[RFC8126\]](#).

All values not suggested are available for assignment. The allocation of new values MUST be done via "Expert Review" procedures.

3.1. Key Type Registry

This section defines the Key Type Registry that is used to identify a specific Key Type. It also suggests values for Experimental, Well-Known, and OUI Key Types.

The range of valid values is 1 - 255.

0 is an illegal value and MUST NOT be allocated to or used by any implementation. It MUST be ignored on reception.

3.1.1. Requested Entries

| Key Type | Value | Description |
|--------------|-------|---|
| Experimental | TBD1 | Indicates that the Key is Experimental. |
| Well-Known | TBD2 | Indicates that the Key is Well-Known. |
| OUI | TBD3 | Indicates that the Key is OUI. |

Table 1

3.2. Experimental Key Type

This value indicates that a specific key is Experimental.

The range of valid values is 1 - 16777215 ($2^{24}-1$).

0 is an illegal value and MUST NOT be allocated to or used by any implementation. It MUST be ignored on reception.

3.2.1. Requested Entries

| Experimental Key | Identifier | Description |
|------------------|------------|--------------|
| Illegal | 0 | Not allowed. |

Table 2

3.3. Well-Known Key Type

This value indicates that a specific key is Well-Known.

The range of valid values is 1 - 16777215 ($2^{24}-1$).

0 is an illegal value and MUST not be allocated to or used by any implementation. It MUST be ignored on reception.

3.3.1. Requested Entries

| Well-Known Key | Identifier | Description |
|----------------------------|------------|----------------|
| Illegal | 0 | Not allowed. |
| MAC/IP Binding | TBD1 | To be defined. |
| FAM Security Roll-Over Key | TBD2 | To be defined. |

Table 3

3.4. OUI Key Type

This value indicates a specific OUI Key using an organization's reserved OUI space.

The range of valid values is 1 - 16777215 ($2^{24}-1$).

0 is an illegal value and MUST NOT be allocated to or used by any implementation. It MUST be ignored on reception.

3.4.1. Requested Entries

| OUI Key | Identifier | Description |
|---------|------------|--------------|
| Illegal | 0 | Not allowed. |

Table 4

4. Security Considerations

This document introduces no new security concerns to RIFT or other specifications referenced in this document given that the TIEs that carry KV pairs are already extensively secured by the [RIFT](#) [[RIFT](#)] specification itself.

5. Acknowledgements

To be provided.

6. Normative References

- [RFC2119] 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>>.
- [RFC8126] Cotton, M., Leiba, B., and T. Narten, "Guidelines for Writing an IANA Considerations Section in RFCs", June 2017, <<https://www.rfc-editor.org/info/rfc8126>>.
- [RIFT] Przygienda, T., Sharma, A., Thubert, P., Rijsman, B., and D. Afanasiev, "RIFT: Routing in Fat Trees", Work in Progress, draft-ietf-rift-rift-12, May 2020.

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