

RIFT  
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RIFT Key/Value Structure and Registry  
draft-ietf-rift-kv-registry-01

## Abstract

The Routing in Fat-Trees RIFT [[RIFT](#)] protocol 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

The Routing in Fat-Trees RIFT [[RIFT](#)] protocol 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.

For example, it might be beneficial to advertise overlay protocol state from leaf nodes to the Top-of-Fabric (ToF) nodes. This would make it possible to view critical state of a fabric-wide service from a single ToF node rather than retrieving and reconciling the same state from multiple leaf nodes.

[2.](#) Key Structure

This section describes the generic Key structure and semantics, Figure 1 further illustrates these components.

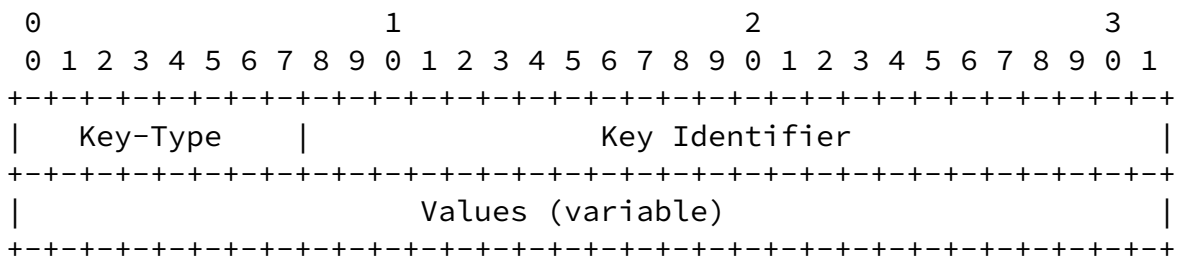


Figure 1: Generic Key-Value Structure

\*where:\*

\*Key-Type:\*

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

The range of valid values is 1 - 255 (2<sup>8</sup>-1).

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

\*Key Identifier:\*

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

The range of valid values is 1 - 16777215 (2<sup>24</sup>-1).

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

\*Values:\*

A variable length value that contains data associated with the Key Identifier. 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's specification.

## 2.1. Experimental Key-Type

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

As shown in Figure 2, the Key-Type will be used to identify the Key-Type as Experimental. The Key Identifier will be used to identify the specific key and describe the structure of the contained values.

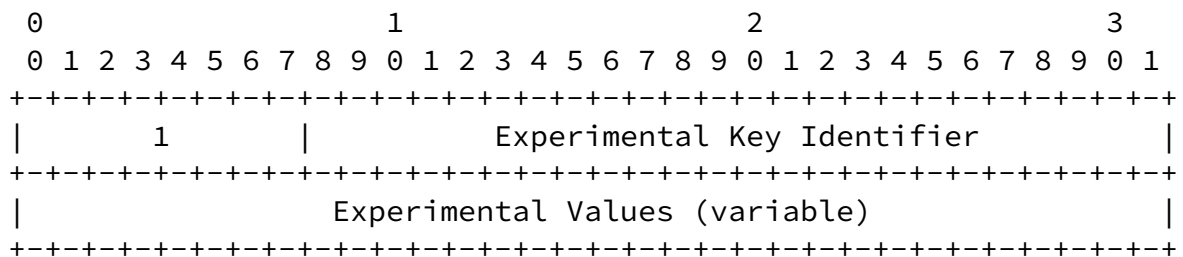


Figure 2: Experimental Key-Type

## 2.2. Well-Known Key-Type

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

As shown in Figure 3, the Key-Type will be used to identify the Key-Type as Well-Known. The Key Identifier will be used to identify the specific key and describe the structure of the contained values.

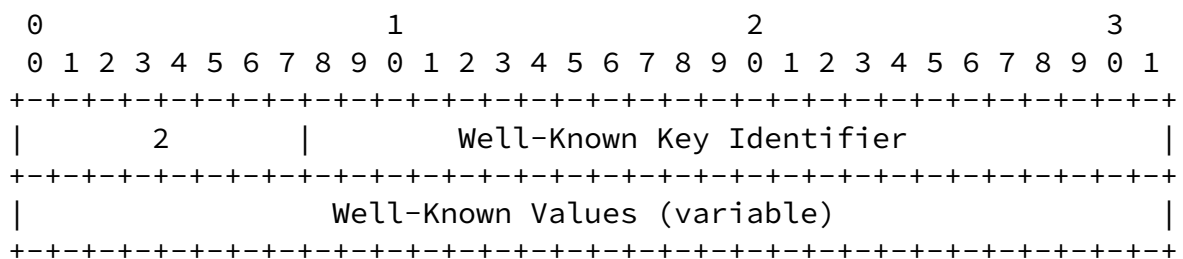


Figure 3: Well-Known Key-Type

### 2.3. OUI Key-Type

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

As shown in Figure 4, the Key-Type will be used to identify the Key-Type as OUI. The Key Identifier MUST use the implementing organization's reserved OUI space to indicate the key and value structure.

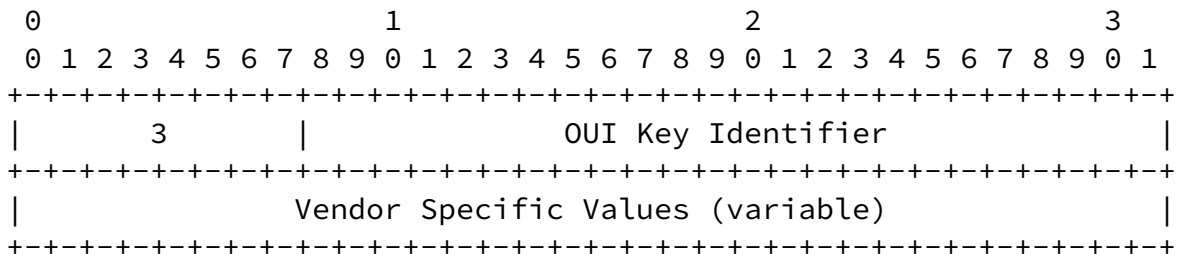


Figure 4: OUI Key-Type

### 3. Operational Considerations

While no restrictions are placed on Key-Value data or what it is used for, it is RECOMMENDED that a serialized Thrift model be used for simpler interoperability. [\[RIFT-AUTO-EVPN\]](#) is an example of this type of implementation.

Key-Value elements SHOULD NOT be used to carry topology information used by RIFT itself to perform distributed computations.

In cases where KV-TIEs are flooded from north to south, policies

SHOULD be implemented in order to avoid network-wide flooding.

For networks with more than one ToF node, it is RECOMMENDED that those ToF nodes contain identical KV-TIE information when being distributed from north to south. RIFT [[RIFT](#)] requires that only one KV-TIE is selected when identical keys are received from multiple northbound neighbors. If this is not considered then the tie-breaking rules may cause a node to select a suboptimal KV-TIE. Consider a case where failure conditions cause the ToF nodes to become split-brained. While the Key-Type and Key Identifier will be identical, the value(s) contained within may differ. The node(s) receiving these differing KV-TIEs will select the one from the ToF node with the highest System ID, potentially leading to unintended effects.

#### [4.](#) IANA Considerations

This section requests that IANA create two new registries the "RIFT Key-Type" and "RIFT Well-Known Key-Type" registries in accordance with [[RFC8126](#)].

Experts reviewing requests for new values to either registry MUST consider the items in the Expert Review Guidance ([Section 4.3](#)) section.

The following sections detail each registry's requirements and suggested values.

##### [4.1.](#) RIFT Key-Type Registry

This section requests that IANA create and help govern the following registry:

\*Registry Name:\*  
RIFT Key-Type Registry

\*Registration Procedures:\*  
Expert Review

\*Description:\*

Key-Type registry for the RIFT protocol.

\*Reference:\*  
This document.

#### [4.1.1.](#) RIFT Key-Type Registry Requested Entries

This section requests that IANA register the following suggested values to the "RIFT Key-Type Registry".

Value	Key-Type	Description	Status/ Reference
0	Illegal	Not allowed.	This document
1	Experimental	Indicates that the Key-Type is Experimental.	This document.
2	Well-Known	Indicates that the Key-Type is Well-Known.	This document.
3	OUI	Indicates that the Key-Type is OUI (vendor specific).	This document.

Table 1

#### [4.2.](#) RIFT Well-Known Key-Type Registry

This section requests that IANA create and help govern the following registry:

\*Registry Name:\*  
RIFT Well-Known Key-Type Registry

\*Registration Procedures:\*  
Expert Review

\*Description:\*  
Well-Known Key-Type (2) registry for the RIFT protocol.

\*Reference:\*  
This document.

#### [4.2.1.](#) RIFT Well-Known Key-Type Registry Requested Entries

This section requests that IANA register the following suggested values to the "RIFT Well-Known Key-Type Registry".

Value	Key-Identifier	Description	Status/Reference
0	Illegal	Not allowed.	This document.
1	MAC/IP Binding	To be defined.	To be defined.
2	FAM Security Roll-Over Key	To be defined.	To be defined.

Table 2

#### [4.3.](#) Expert Review Guidance

Experts reviewing requests for values from the RIFT Key-Type Registry or the the the Well-Known RIFT Key-Type Registry are responsible for the following:

1. Determining the existence of a specification that clearly defines the purpose supporting the request and MUST contain all required fields for given registry.

The document MUST also be permanent and publically available.

2. Ensuring that any requests are made available to the RIFT working group for review should the work originate from outside of the RIFT Working Group.

3. Ensuring that any work produce outside of the IETF does not



conflict with any work that is already published or actively pursuing being published.

## 5. Security Considerations

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

## 6. Acknowledgements

To be provided.

## 7. 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., Rijnsman, B., and D. Afanasiev, "RIFT: Routing in Fat Trees", Work in Progress, [draft-ietf-rift-rift-15](#), July 2021.
- [RIFT-AUTO-EVPN] Head, J., Przygienda, T., and W. Lin, "RIFT Auto-EVPN", Work in Progress, [draft-head-rift-auto-evpn-02](#), March 2022.

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