

Internet Engineering Task Force (IETF)  
Request for Comments: 7135  
Category: Informational  
ISSN: 2070-1721

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May 2014

## Registering a SIP Resource Priority Header Field Namespace for Local Emergency Communications

### Abstract

This document creates the new Session Initiation Protocol (SIP) Resource Priority header field namespace 'esnet' and registers this namespace with IANA. The new header field namespace allows for local emergency session establishment to a public safety answering point (PSAP), between PSAPs, and between a PSAP and first responders and their organizations.

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## 1. Introduction

This document creates the new Session Initiation Protocol (SIP) Resource Priority header (RPH) field namespace 'esnet' for local emergency usage and registers this namespace with IANA. The SIP Resource-Priority header field is defined in RFC 4412 [RFC4412]. The new 'esnet' namespace is to be used for inbound calls towards a public safety answering point (PSAP), between PSAPs, and between a PSAP and first responders or their organizations within managed IP networks. This namespace is not for use on the open public Internet because it can be trivially forged.

Adding an RPH with the 'esnet' namespace can be differentiated from the marking of an emergency call using a service URN as defined in [RFC5031] in that the RPH specifically requests preferential treatment in networks that honor it, while the marking merely identifies an emergency call without necessarily affecting resources allocated to it. It is appropriate to use both where applicable. RPH with 'esnet' may also be used within public safety networks for SIP sessions that are not emergency calls and thus not marked per RFC 5031.

This new namespace is included in SIP requests to provide an explicit priority indication within controlled environments, such as an IP Multimedia Subsystem (IMS) infrastructure or Emergency Services network (ESInet) where misuse can be reduced to an acceptable level because these types of networks have controls in place. The function facilitates differing treatment of emergency SIP requests according to local policy, or more likely, a contractual agreement between the network organizations. This indication is used solely to differentiate certain SIP requests, transactions, or dialogs from other SIP requests, transactions, or dialogs that do not have the need for priority treatment. If there are differing, yet still understandable and valid Resource-Priority header values in separate

SIP requests, then this indication can be used by local policy to determine which SIP request, transaction, or dialog receives which treatment (likely better or worse than another).

Application Service Providers (ASPs) that are securely connected to an ESInet may have sufficient controls policing the header, and a trust relationship with the entities inside the ESInet. SIP requests from such ASPs could make use of this 'esnet' namespace for appropriate treatment when requests are passed from the ASP to the ESInet.

The 'esnet' namespace may also be used on calls from a PSAP or other public safety agency on an ESInet towards a private or public network, ASP or User Agent ("call back") when priority is needed. Again, the request for priority is not for use on the public Internet due to the ease of forging the header.

This document merely creates the namespace, per the rules within [RFC4412] as updated by [RFC7134], which necessitates that new RPH namespaces and their relative priority-value order be IETF reviewed before being registered with IANA.

There is the possibility that within emergency services networks, Multilevel Precedence and Preemption (MLPP)-like behavior can be achieved (likely without the 'preemption' part), provided the local policy supports enabling this function. For example, calls placed between law enforcement agents could be marked similarly to MLPP systems used by military networks, and some of those calls could be handled with higher priority than an emergency call from an ordinary user. Therefore, the 'esnet' namespace is given five priority-levels instead of just one. This document does not define MLPP-like SIP signaling for emergency calls like those using emergency service numbers (such as 911, 112, and 999), but it is not prevented either.

Within the ESInet, there will be emergency calls requiring different treatments, according to the type of call. Does a citizen's call to a PSAP require the same, a higher, or a lower relative priority than a PSAP's call to a police department or the police chief? What about either relative to a call from within the ESInet to a national government's department responsible for public safety, disaster relief, national security/defense, etc.? For these additional reasons, the 'esnet' namespace has multiple priority levels.

This document does not define any of these behaviors, outside of reminding readers that the rules of RFC 4412 apply - though examples of usage are included for completeness. This document registers the 'esnet' RPH namespace with IANA for use within any emergency services networks, not just of those from citizens to PSAPs.

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].

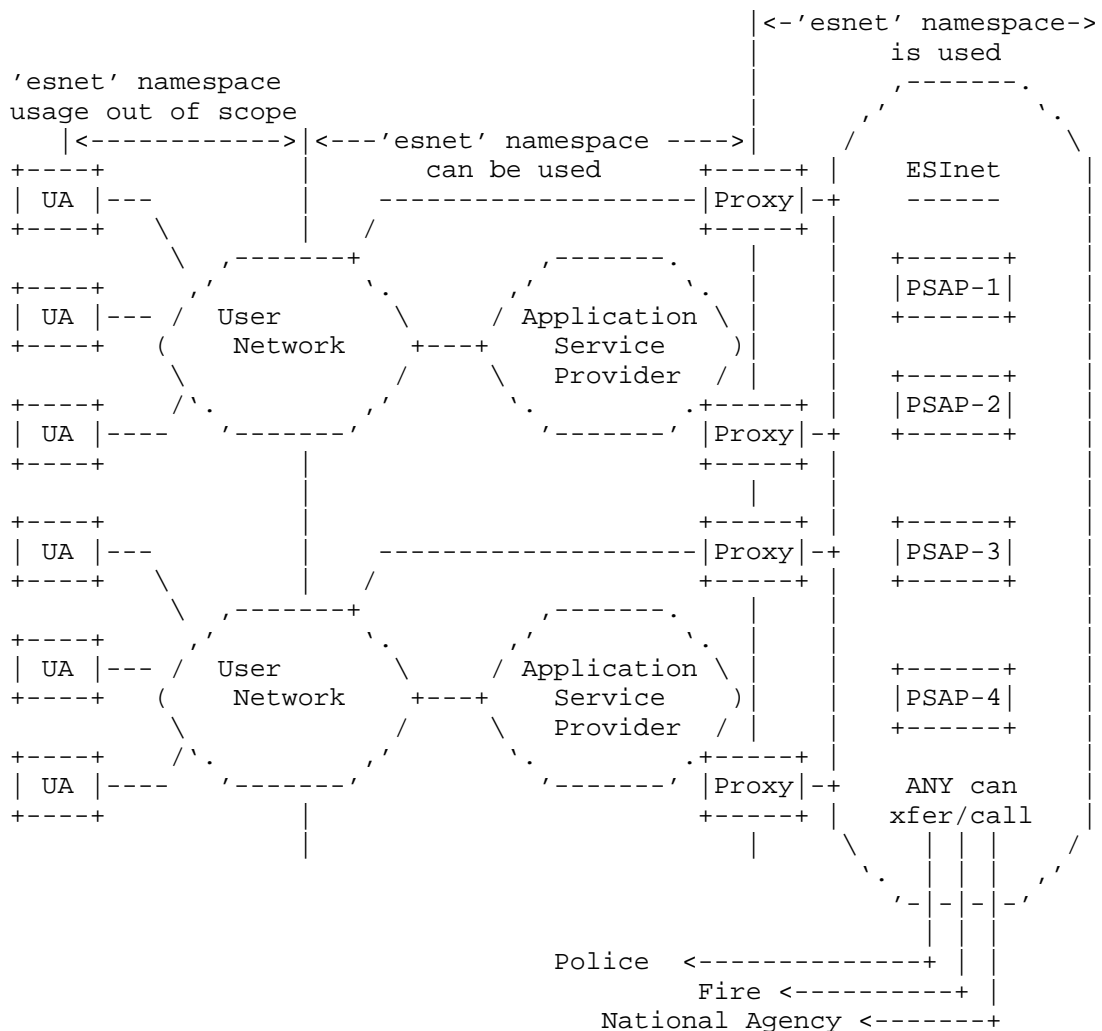
## 2. Rules of Usage of the Resource Priority Header field

This document retains the behaviors of the SIP Resource Priority header field, defined in [RFC4412], when choosing between the treatment options surrounding this new 'esnet' namespace. Given the environment this is to be used within (i.e., within an ESInet), the usage of the 'esnet' namespace does not have a 'normal' or routine call level; that is left for local jurisdictions to define within their respective parts of the ESInet, which could be islands of local administration.

The 'esnet' namespace MUST only be used where at least one end of the signaling, setting aside the placement of B2BUAs (Back-to-Back User Agents), is within a local emergency organization. In other words, if either the originating human caller's User Agent (UA) or the destination human callee's UA is part of the local emergency organization, this is a valid use of 'esnet'.

The 'esnet' namespace has 5 priority-values, in a specified relative priority order, and is registered as a queue-based namespace in compliance with [RFC4412]. SIP entities that support preemption treatment (see Section 5 of [RFC4412]) can be configured according to local policy. Display names for the 'esnet' values displayed can likewise be set according to local policy.

The following network diagram provides one example of local policy choices when using the 'esnet' namespace:



A Possible Network Architecture Using the 'esnet' Namespace

In the figure, the 'esnet' namespace is used within the ESInet on the right side of the diagram. How it is specifically utilized is out of scope for this document and is left to local jurisdictions to define. Whether preemption is implemented in the ESInet and the values displayed to the ESInet users is likewise out of scope. Adjacent ASPs to the ESInet may have a trust relationship that includes allowing this/these neighboring ASP(s) to use the 'esnet' namespace

to differentiate SIP requests and dialogs within the ASP's network. The exact mapping between the internal and external sides of the edge proxy at the ESInet boundaries is out of the scope of this document.

### 3. "esnet" Namespace Definition

The 'esnet' namespace is not generic for all emergencies because there are a lot of different kinds of emergencies, some on a military scale ([RFC4412] defines 3 of these), some on a national scale ([RFC4412] defines 2 of these), and some on an international scale. Each type of emergency can also have its own namespace(s); although there are many defined for other uses, more are possible -- so using the public emergency service number (such as 911, 112, or 999) to call for police officers, firefighters, or emergency medical technicians (etc.) does not have a monopoly on the word "emergency".

The namespace 'esnet' has been chosen, roughly to stand for "Emergency Services NETwork", for a citizen's call for help from a public authority type of organization. This namespace will also be used for communications between emergency authorities, and it MAY be used by emergency authorities to call public citizens. An example of the latter is a PSAP operator calling back someone who previously called an emergency service number (such as 911, 112, or 999) and the communication was terminated before it -- in the PSAP operator's judgment -- should have been.

Below is an example of a Resource-Priority header field using the 'esnet' namespace:

```
Resource-Priority: esnet.0
```

#### 3.1. Namespace Definition Rules and Guidelines

This specification defines one unique namespace for emergency calling scenarios, 'esnet' and registers this namespace with IANA. This IANA registration contains the facets defined in Section 9 of [RFC4412].

#### 3.2. The 'esnet' Namespace

Per the rules of [RFC4412], each namespace has a finite set of relative priority-value(s), listed (below) from lowest priority to highest priority. In an attempt to not limit this namespace's use in the future, more than one priority-value is assigned to the 'esnet' namespace. This document does not recommend which Priority-value is used where in which situation or scenario. That is for another document to specify. To be effective, the choice within a national

jurisdiction needs to be coordinated by all sub-jurisdictions to maintain uniform SIP behavior throughout an emergency calling system of that nation.

The relative priority order for the 'esnet' namespace is as follows:

```
(lowest)  esnet.0
          esnet.1
          esnet.2
          esnet.3
(highest) esnet.4
```

The 'esnet' namespace will have priority queuing registrations for these levels per Section 4.5.2 of [RFC4412]. Although no preemption is specified in this document for any levels of 'esnet', local jurisdiction(s) MAY configure their SIP infrastructure to use this namespace with preemption, as defined in RFC 4412.

The remaining rules that originated in RFC 4412 apply with regard to an RP actor who understands more than one namespace, and must maintain its locally significant relative priority order.

#### 4. IANA Considerations

##### 4.1. IANA Resource-Priority Namespace Registration

The following entry has been added to the "Resource-Priority Namespaces" registry of the sip-parameters section of IANA (created by [RFC4412]):

Namespace	Levels	Algorithm	Intended Code	New warn-code	New resp. Reference
-----	-----	-----	-----	-----	-----
esnet	5	queue	no	no	RFC 7135

##### 4.2. IANA Priority-Value Registrations

The following entry has been added to the "Resource-Priority Priority-values" registry of the sip-parameters section of IANA:

```
Namespace: esnet
Reference: (this document)
Priority-Values (least to greatest): "0", "1", "2", "3", "4"
```

## 5. Security Considerations

The Security considerations that apply to RFC 4412 [RFC4412] apply here.

For networks that act on the SIP Resource-Priority header field, incorrect use of namespaces can result in traffic that should have been given preferential treatment not receiving it, and vice versa. This document does not define a use case where an endpoint outside the ESInet marks its call for preferential treatment. Precautions need to be taken to prevent granting preferential treatment to unauthorized users not calling for emergency help even if they are in the ESInet, as well as to prevent misuse by callers outside the ESInet.

A simple means of preventing this usage is to not allow traffic marked 'esnet' to get preferential treatment unless the destination is towards the local/regional ESInet. This is not a consideration for internetwork traffic within the ESInet, or generated out of the ESInet. Calling an emergency service number (such as 911, 112, or 999) is fairly local in nature, with a finite number of URIs that are likely to be considered valid within a portion of a network receiving SIP signaling.

This namespace is not intended for use on the Internet because of the difficulty in detecting abuse; specifically, it can trivially be forged and used on a non-emergency session to obtain resource priority. Some networks may determine that it can reasonably prevent abuse and/or that the consequences of undetected abuse is not significant. In such cases, use of 'esnet' on the Internet MAY be allowed.

## 6. Acknowledgements

Thanks to Ken Carlberg, Janet Gunn, Fred Baker, and Keith Drage for help and encouragement with this effort. Thanks to Henning Schulzrinne, Ted Hardie, Hannes Tschofenig, and Marc Linsner for constructive comments. A big thanks to Robert Sparks for being patient with the author and Brian Rosen for completing the final edits.

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