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**Accounting on Softwires**  
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## Abstract

For access network operators, accounting information are crucial: they provide information for billing and give an overview of the traffic usage. This document defines the requirements for accounting information needed on Softwires.

## **1. Motivation**

The Softwires WG is working on a solution to bring IPvX connectivity over an IPvY network [[RFC4925](#)]. This solution may be deployed and managed by access network operators to provide for example IPvX continuity of service. Operators should then consider the Softwires solution as an extension of their access network service.

For operators, AAA [[RFC2865](#)] is the key feature for access network deployment: Authentication verifies user credentials, Authorization ensures access network integrity and Accounting provides information for billing and network management. Information from accounting usually includes measurements of in and out octets and packets [[RFC2867](#)].

As an alternative access network, the Softwires solution should provide similar AAA features. For instance accounting on the softwire should give to the operator measurements of the traffic generated by the user using this access network. In a dual stack (IPvX and IPvY) network, the operator may want to manage information about the comparative usage of both protocols, for example for billing purpose. When the softwire is used to access IPvX over IPvY, accounting information will be specific to IPvX. Operators should be able to differentiate for which version of IP such information are relevant. This differentiation may become important if such operators offer a softwire solution for both IPvX over IPvY and IPvY over IPvX access networks.



## 2. Study case

In this section is given an example of IPv6 access over IPv4 network which is similar to the Hub-and-Spokes problem stated in the Softwires WG ([RFC4925]). The Point6box architecture uses L2TP [RFC2661] and PPP for IPv6 tunneling over IPv4 (see Figure 1). Radius manages AAA parameters for the access network created by the tunnel. On the server side, PPP sends to RADIUS accounting information measuring the traffic generated by the customer.

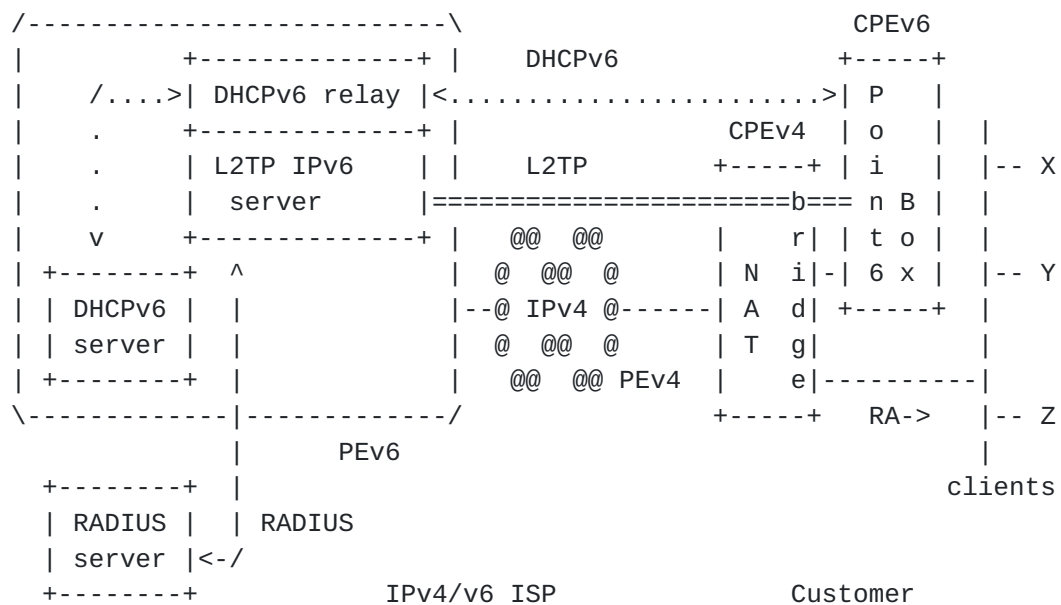


Figure 1: Point6Box Service Architecture



### **3. Problem statement**

The accounting information defined for tunnels [[RFC2867](#)] includes attributes Acct-{Input,Output}-Octets and Acct-{Input,Output}-Packets for traffic measurements. These attributes do not depend of the version of IP used by the monitored traffic. Operators may not be able to differentiate IPv4 from IPv6 traffic in their accounting statistics. This non-differentiation even leads to mis-usages: In the current PPP implementation from BSD, the values of these attributes are only based on IPv4 statistics collected from IPCP protocol. No statistics are collected for IPv6 from IPV6CP.

This proposal should decide which attributes may be candidate for IP-version differentiation. In operating system MIBs, values for in/out octets on a network interface are independent of the IP version. Having such values for each version may be usefull for monitoring and billing purpose. However the differentiation is done for in/out IPv4 and IPv6 packets on a network interface. Operators can extract from these values some hints about the usage of each version of the IP protocol but can not give quantitative report of bandwidth usage.





## **4. Proposed solutions**

### **4.1. Summing accounting informations**

In the Point6Box solution, the PPP negotiation only initiates the IPV6CP protocol on the tunnel. The PPP statistics handling requires some modifications to get IPv6-specific accounting information in Radius attributes. A minor modification of the code may consist in filling the RADIUS attributes with the sum of both IPCP and IPV6CP values. But still no differentiation is made on the version of IP used. Such solution do not match the requirements stated before.

### **4.2. Differentiation based on context**

A RADIUS accounting entry, as defined in [[RFC2867](#)] and updated by [[RFC3162](#)], also includes the NAS-IP-Address and NAS-IPv6-Address attributes, which gives the IP address of the NAS used as the softwire endpoint. Based on this information, an operator can decide if this softwire is based on IPv4 or IPv6. In the case of provider only deploying IPv6 over IPv4 and IPv4 over IPv6 softwires, the nature of the traffic reported in the accounting information depends of which attribute between NAS-IP-Address and NAS-IPv6-Address is set. If NAS-IP-Address is set in the accounting entry, accounted traffic is IPv6. If NAS-IPv6-Address is set in the accounting entry, accounted traffic is IPv4. However, this solution requires extra checking when building accounting report and obviously does not work in case of IPvX over IPvX softwires.

### **4.3. Differentiation based on Attributes**

Another solution is to have separate accounting attributes for IPv4 and IPv6. The accounting information should then be provided depending on the softwire access:

- o IPv4-only access: Only IPv4 accounting values are provided. IPv6 accounting values should be filled as null,
- o IPv6-only access: Only IPv6 accounting values are provided. IPv4 accounting values should be filled as null,
- o Dual stack IPv4 and IPv6 access: Values for both protocols should be provided.



## **5. Security Considerations**

The Point6Box approach and the proposed extension of RADIUS only use already existing protocols and add supplementary attributes. No new security issue should be introduced.

## **6. Normative References**

- [RFC2661] Townsley, W., Valencia, A., Rubens, A., Pall, G., Zorn, G., and B. Palter, "Layer Two Tunneling Protocol "L2TP"", [RFC 2661](#), August 1999.
- [RFC2865] Rigney, C., Willens, S., Rubens, A., and W. Simpson, "Remote Authentication Dial In User Service (RADIUS)", [RFC 2865](#), June 2000.
- [RFC2866] Rigney, C., "RADIUS Accounting", [RFC 2866](#), June 2000.
- [RFC2867] Zorn, G., Aboba, B., and D. Mitton, "RADIUS Accounting Modifications for Tunnel Protocol Support", [RFC 2867](#), June 2000.
- [RFC3162] Aboba, B., Zorn, G., and D. Mitton, "RADIUS and IPv6", [RFC 3162](#), August 2001.
- [RFC4925] Li, X., Dawkins, S., Ward, D., and A. Durand, "Softwire Problem Statement", [RFC 4925](#), July 2007.



## **Appendix A. Revision History**

Changes between -01 and -02:

- o Fix section "Differentiation based on context" by introducing NAS-IPv6-Address from [RFC3162](#). Thanks to D.Romascanu for pointing that during the review of the Softwires Hub-and-spoke framework document.
- o Update some authors new employers

Changes between -00 and -01:

- o Add new solution in [Section 4.2](#).
- o Moved paragraph about system MIBs in [Section 3](#).



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