Extended Attributes

RADEXT - IETF 80

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Motivation

- RADEXT discussions have been long

- We need a solution soon (i.e. within 2-3 years)

- Other proposals were complex

- Attribute audit shows the needs to be simple

One Octet of Change

Now

Type	Length	Value …
1 octet	1 octet	1..252 octets

Extended format

Type	Length	**Ext-Type**	Value …
1 octet	1 octet	**1 octet**	1..252 octets

That's pretty much it.

- "Steal" one octet from "Value" for extended types

- Allocate 4 attributes of this format (241..244)

  - $256*4 =\sim 1K$ new attributes

- Should be enough for the forseeable future

Grouping

- Flexible grouping by defining a TLV data type

- Already in WiMAX, 3GPP2, and other SDOs / vendors.

- Code is widely deployed in production systems

TLV-Type	TLV-Length	Value …
1 octet	1 octet	1..253 octets

TLV Properties

- Can carry any existing or future data type

  - Including TLVs.

- Multiple TLVs can be carried in one Ext-Attr

  - Nested *or* concatenated

- Nesting is limited only by TLV-Length field

  - 253 / 3 =~ 80

- Practicalities show a depth of 5 is sufficient

Naming: Not just 8 bits

- We need to name the new attribute types.

- Use OID style "dotted number"

- 241.{1-255}

  - 241.1 "This-Is-A-New-attr"

- Versus

  - 1 "User-Name"

- **Naming applies only for the IANA registry**

TLV Naming

- Leverage the same "dotted number" notation!

- 241.1.2

  - RADIUS Attr 241, of type "ext-attr"

  - Extended Attr 1, data type "tlv"

  - TLV 2, data type "integer"

- Allows for ~250 fields in a struct

  - Extends type space past 1K attributes

"Long" Attributes

- Leverage the Ext-Type format, and add "flags"

- Allocate 2 attributes of this type (245, 246)

Extended format with flags

Type	Length	Ext-Type	Flags	Value …
1 octet	1 octet	1 octet	1 octet	1..251 octets

Flags

- 1 bit of "C" for Continuation

  - Same meaning as existing ext-attrs / WiMAX

- 7 bits of "reserved"

  - We have no idea what to do with these

  - It's likely that these will never be used

Additional notes

- 24{1-6}.26 are VSAs, with fixed format

  - Allows for many more **standardized** VSAs

- 24{1-6}.{241-255} are reserved

- No "experimental" or "implementation-specific"

  - They have not been useful

- Detailed instructions for IANA are included

Implementations

- Two inter-operable implementations:

  - In FreeRADIUS "master" branch

    - http://git.freeradius.org

  - IEA Software

    - http://www.iea-software.com/products/radlogin4.cfm

- Looking for more!

Summary

- ~1.5K new attributes (many 1000's with TLVs)

- Grouping via TLVs (proven to work in SDOs)

- Standard way to have "long" attrs (to 4K of data)

- Vendors have ~1.5K new VSAs to work with

- draft includes simple test encoder

  - Helps with inter-operability checks

Questions?

- Who has read the draft?

- Any feedback?

- Who will implement it soon?