Extended Attributes

RADEXT - IETF 81

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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 =~ 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 interoperable implementations:
  - In FreeRADIUS "master" branch
    - http://git.freeradius.org
  - IEA Software
    - http://www.iea-software.com/products/radlogin4.cfm
- BSD licensed library will be released this year
- 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 interoperability checks

Questions?

- Who has read the draft?
- Any feedback?
- Who will implement it soon?