DIAMETER BASE PROTOCOL – An Introduction

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Motivation

- How about using internet in a city where you don't have an account with an ISP?
- Credit Cards

About Diameter

- Provides AAA services for roaming users.
- designed by Pat Calhoun in 1996

AAA Framework

- A- Authentication
  - Involves validating the end users' identity prior to permitting them network access.
  - This process keys on the notion that the end-user possesses a unique piece of information--a username/password combination that serves as unambiguous identification credentials.
  - The AAA server compares the user-supplied authentication data with the user-associated data stored in its database, and if the credentials match, the user is granted network access.

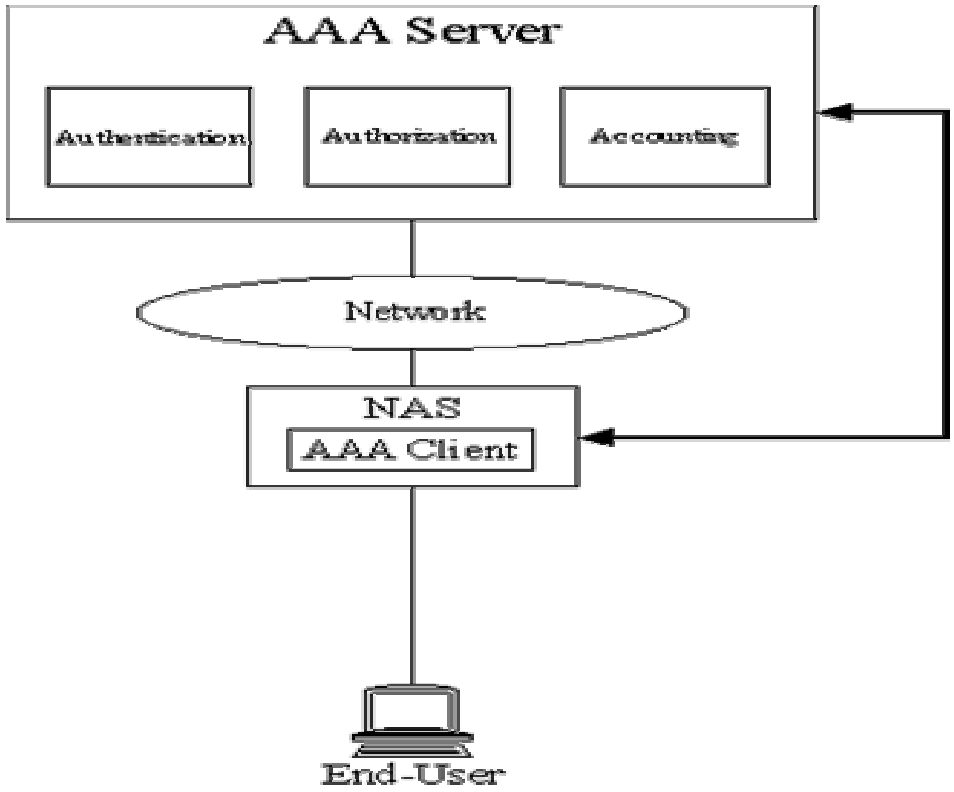
AAA Framework Contd.

- A- Authorization
  - defines what rights and services the end user is allowed once network access is granted.
  - This might include providing an IP address, invoking a filter to determine which applications or protocols are supported, and so on.
  - Authentication and authorization are usually performed together in an AAA-managed environment.

AAA Framework Contd.

- A- Accounting
  - provides the methodology for collecting information about the end user's resource consumption, which can then be processed for billing, auditing, and capacity-planning purposes.

AAA architecture

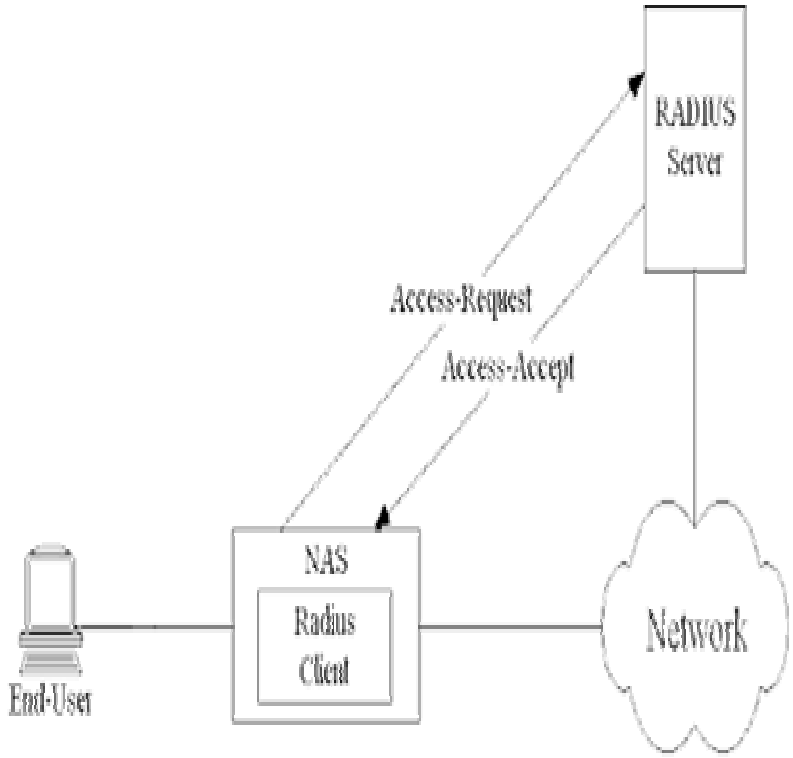


RADIUS

- R Remote
- A Authentication
- D Dial
- I In
- U User
- S Service

Working of RADIUS

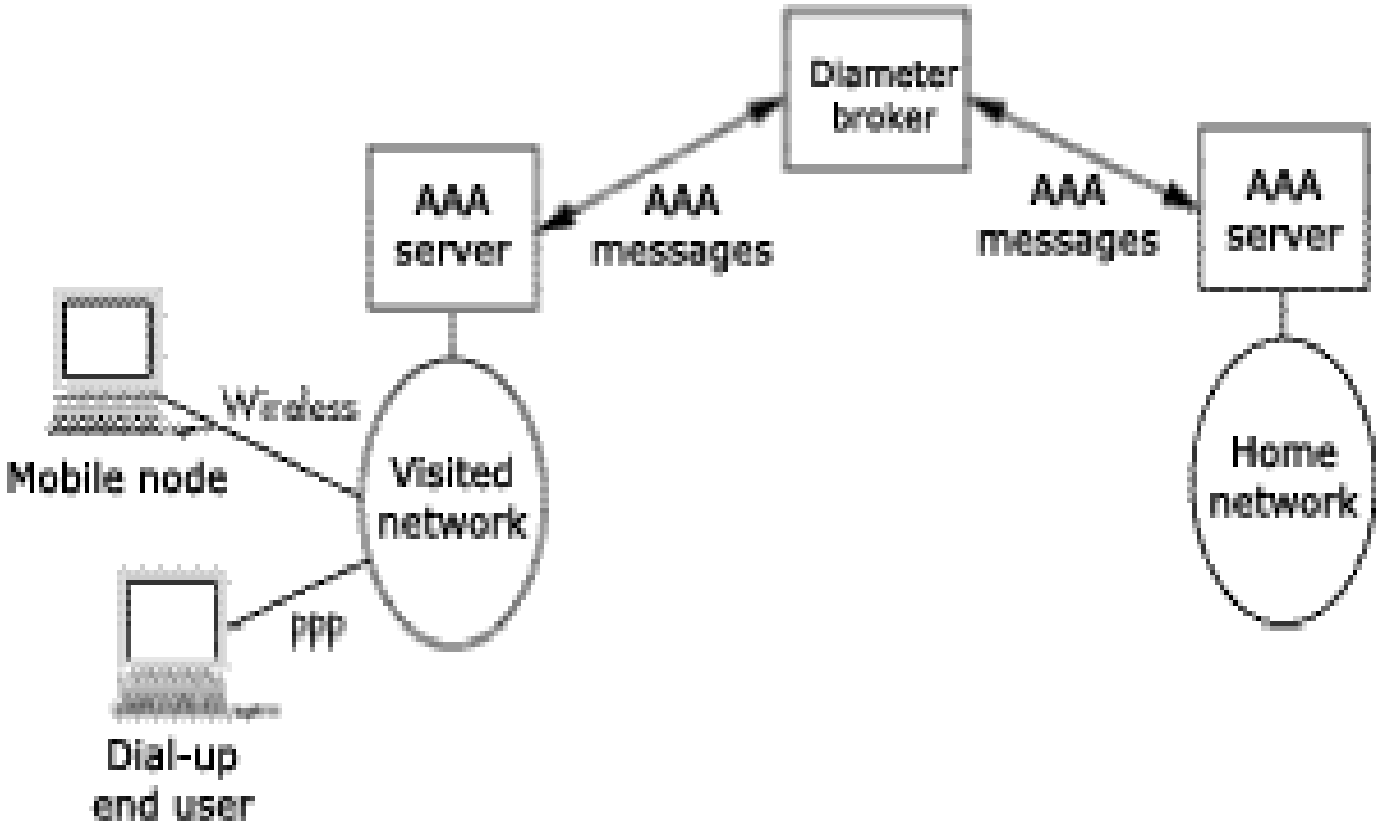
- The RADIUS client on the NAS forwards the end user's credentials in an Access-Request message to the RADIUS server.
- After validating the end user's credentials, the RADIUS server returns an Access-Accept message to the client.



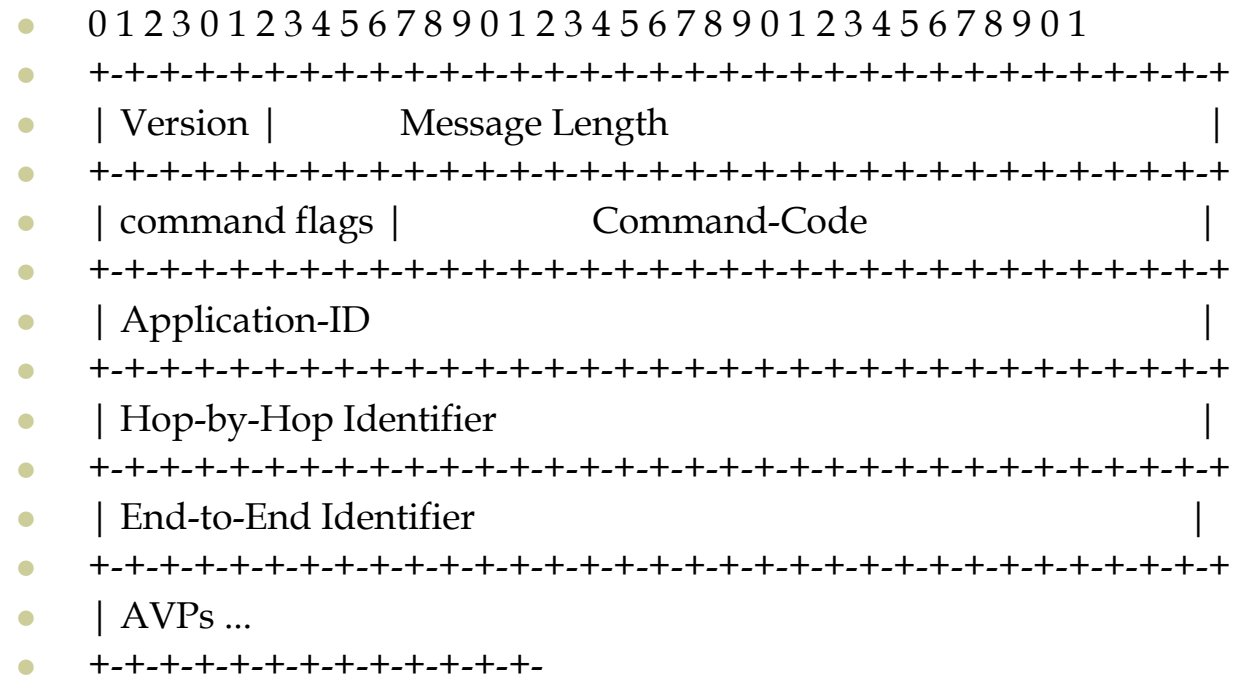
Inspiration for DIAMETER

- Drawbacks of RADIUS
  - Functions with SLIP and PPP for standard analog modems.
  - Cannot authenticate cell phones, handheld or wireless components, VPNs etc.

Working


Diameter broker
AAA server
AAA messages
AAA messages
AAA server
Wireless
Mobile node
Visited network
Home network
PPP
Dial-up end user

DIAMETER Header



Advantages of DIAMETER

- A RADIUS attribute value cannot exceed 255 bytes where as Diameter supports a much larger attribute-value length
- RADIUS server cannot send unsolicited commands to a client, Diameter permits such interaction
- Diameter also employs an improved retransmission and fail-over scheme that provides improved network resilience.
- As AAA cannot afford to be compromised in any way, Diameter provides an end-to-end security mechanism that is not found in RADIUS.

Similarities with RADIUS

- AAA Framework
- AVP: Attribute Value Pair
- PAP (Password Authentication Protocol) support
- CHAP (Challenge Handshake Authentication Protocol) support

DIAMETER or Diameter

- **D**iameter **I**s **A**AA **M**essaging **E**xplained **T**wice as **E**legantly as **R**ADIUS
- **D**ial **I**n **A**ccess **M**anagement **E**ssentially **T**ransport **E**nhanced **R**ADIUS
- **D**istributed **I**nternet **A**uthentication **M**echanism **E**ffecting **T**otal **E**limination of **R**ADIUS

Companies that have implemented DIAMETER

- Eriksson
- Cisco
- Sun
- Airespace
- etc.

References

- P.R. Calhoun et al., "Diameter Base Protocol," rfc [3588] IETF

- Web reference (used for updating): *http://www.computer.org/internet/v3n6/w6onwire3.htm?SMSESSION=NO* and all its references.