Billing and Charging for Broadband Access and Services

Shu LIU
liushu@mail.ritt.com.cn

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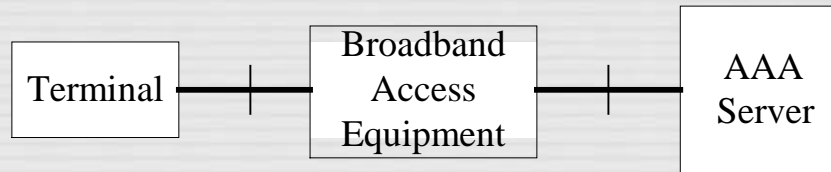
Billing and Charging for Access

➢ The related billing information for subscriber is harder to collect than the POTS;

➢ A subscriber is identified by one username, subscriber has the mobile ability, so access control mechanism is required to authenticate the right for a subscribe to access;

➢ Packet-based switch is based on shared media, so QoS should be taken into consideration.
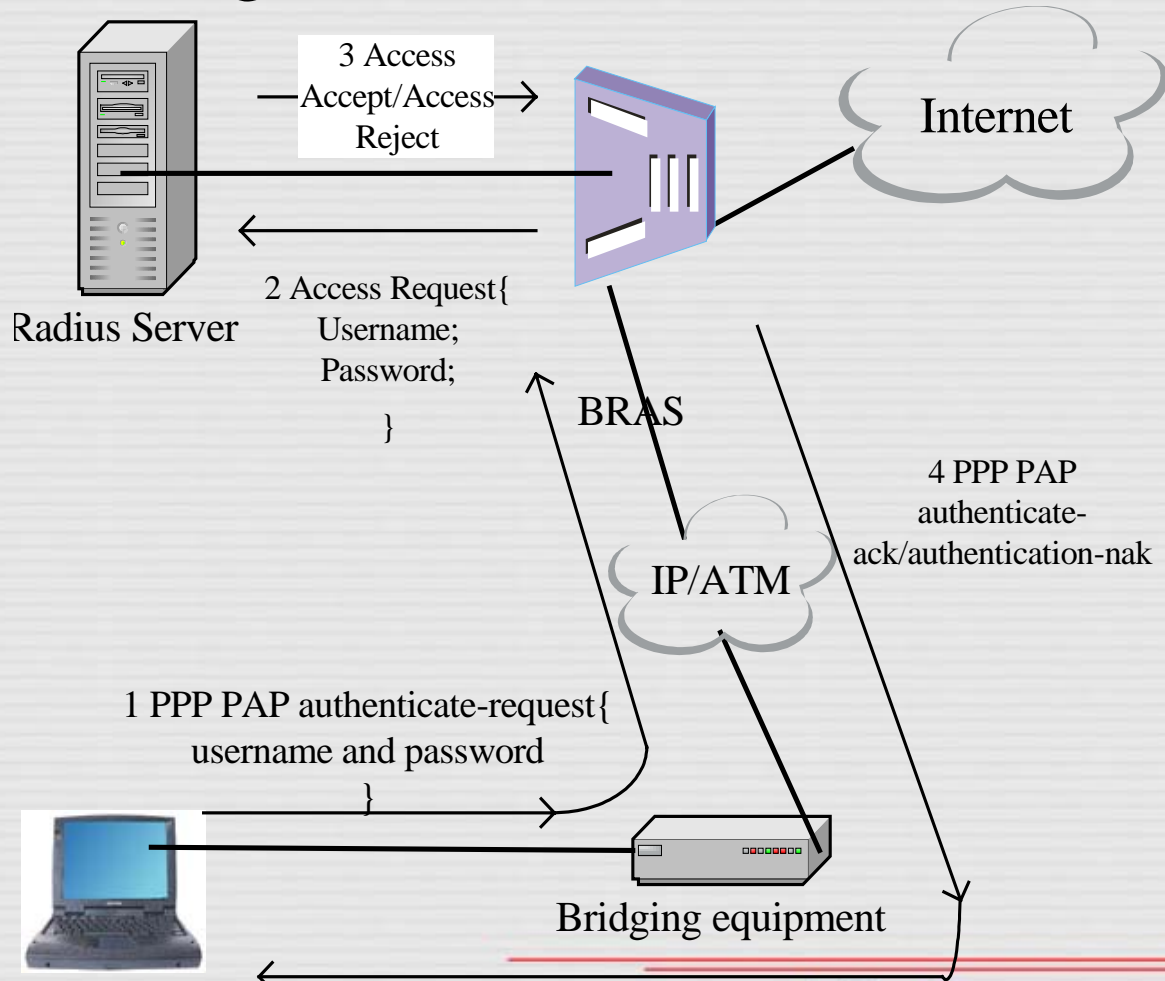
Access Control

- The common architecture of Access Control

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┌──────────┐        ┌──────────────┐        ┌──────────┐
│ Terminal │────┤───│  Broadband   │───┤────│   AAA    │
│          │        │   Access     │        │  Server  │
│          │        │  Equipment   │        │          │
└──────────┘        └──────────────┘        └──────────┘
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- ■ The protocol between Broadband Access Equipment and AAA Server is always RADIUS
- ■ The access methods include
  - PPPoE (the most common access method for China Carrier)
  - Web/Portal   widely used in campus network
 - 802.1x

PPPoE Access Method

- PPPoE Diagram

Radius Server

3 Access Accept/Access Reject

2 Access Request{ Username; Password; }

Internet

BRAS

IP/ATM

4 PPP PAP authenticate-ack/authentication-nak

1 PPP PAP authenticate-request{ username and password }

Bridging equipment

Charging Ratio in Beijing

Plans for a month (Rmb)	available hours	surcharge
24.5	20	0.05Rmb/min
49.5	40	0.05Rmb/min
99.5	100	0.05Rmb/min
190	200	0.05Rmb/min
120	no limit	NA
charge on service duration		0.05Rmb/min

Web/Portal Architecture

Radius Server

Internet

Web/Portal Server

Bridging Equipment

BRAS
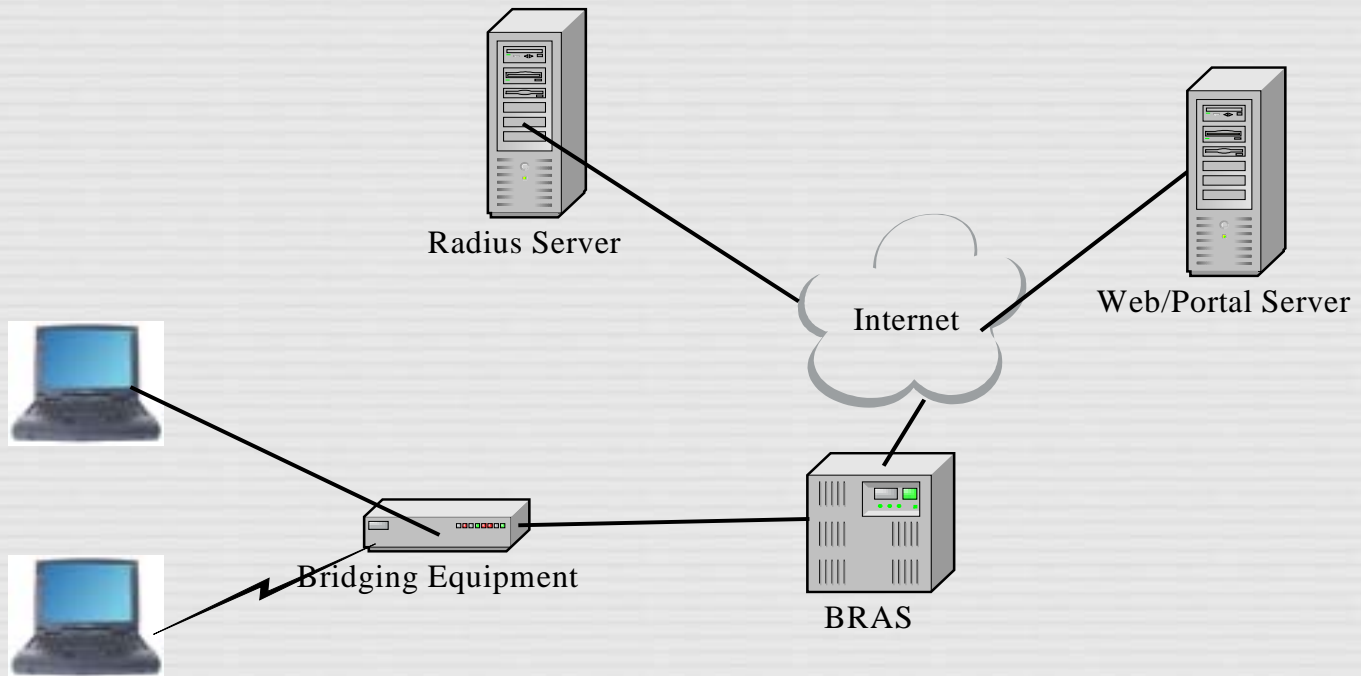
Cont.(1)

- ## Authentication Mechanism

  1)subscriber acquires an IP address from internal DHCP server
  of Web/Portal server

  2 Subscriber inputs username and password via web browser

  3 Web/Portal Server takes the MAC/IP/VID or combined as
     subscriber's ID

  4 Web/Portal server inspects the right to access internet

  5 When log off, subscriber needs unregister via web browser,
     to inform system to stop billing

  6 System will also inspect subscriber's state periodically, when
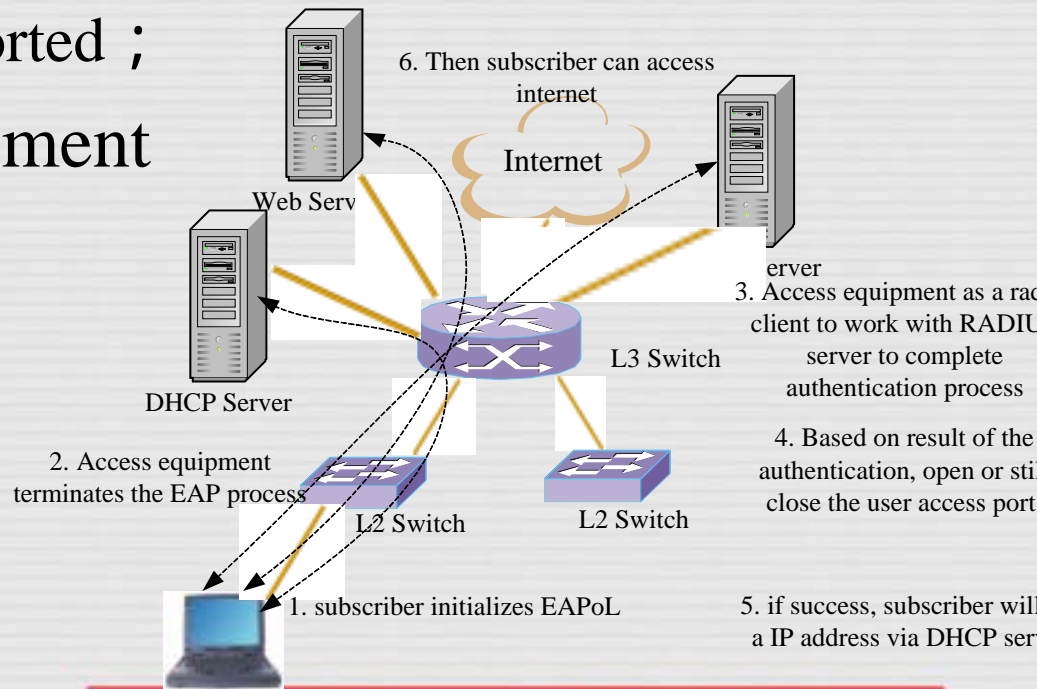   logoff detected, stop billing.

Cont.(2)

Features of Web/Portal access method:

➤ No extra software required, Plug and play

➤ Easy for deploying new services, no limit for the type of the streaming (such as multicast)

➤ High level protocol involved during the authentication

➤ Hard to detect user logoff, charging on duration is not so accurate

➤ Web authentication server is exposed to the subscriber, maybe vulnerable for attack.

Now access fee is 0.2Rmb/Min in China Mobile network.

802.1X Access Method

- The features of IEEE 802.1x
  - Based on Client and server model
  - Based on Layer 2, centralizing controls from Metro network edges
  - Multicast supported
- Distributed Deployment

6. Then subscriber can access internet

Internet

Web Serv

erver

3. Access equipment as a rad client to work with RADIU server to complete authentication process

DHCP Server

L3 Switch

4. Based on result of the authentication, open or sti close the user access port

2. Access equipment terminates the EAP process

L2 Switch

L2 Switch

1. subscriber initializes EAPoL

5. if success, subscriber wil a IP address via DHCP ser

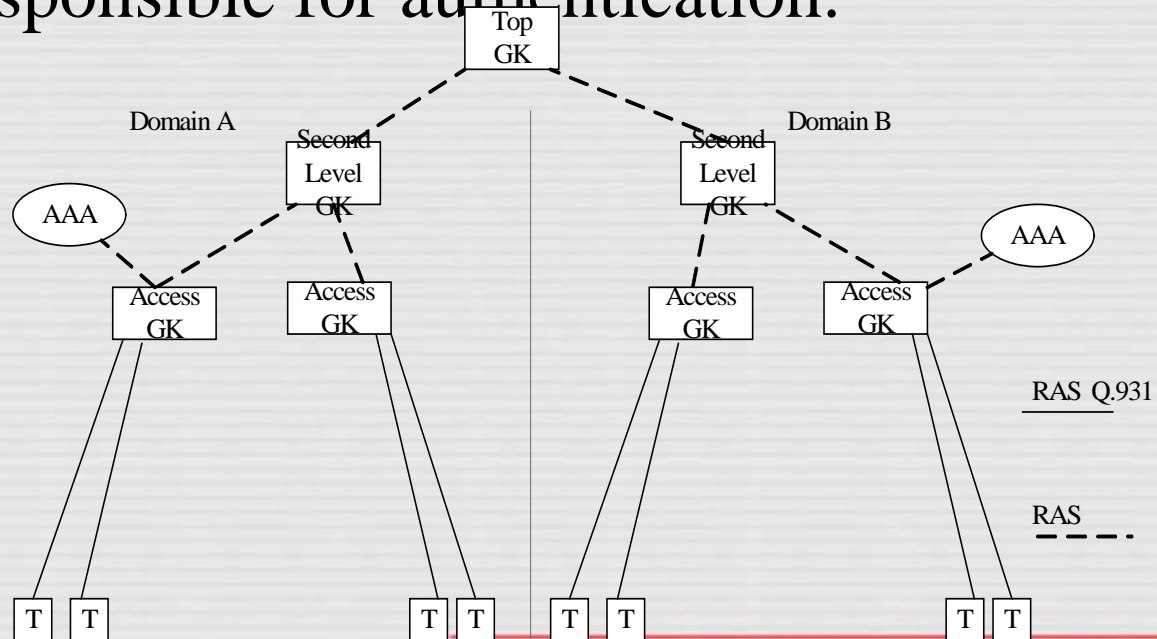# Billing and Charging for Typical Broadband Services

Charging Mode

- Service Plans for each month

- Plans and service duration

- Based on traffic volume

- Charging on each access time

- Discount on date or certain span in a day

- Accumulative service time for bonus from the Carrier

VoIP Service

- The architecture of VoIP based on H.323

  Carrier's VoIP network will always hierarchy mode, the subscriber will register, access the VoIP network with the Access GK, which also is responsible for authentication.

Top GK

Domain A

Second Level GK

AAA

Access GK

Access GK

Second Level GK

Domain B

AAA

Access GK

Access GK

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Charging methods for VoIP

- Based on service duration
- Based on the traffic volume
- Based on bandwidth utility
- Based on QoS parameters
- Combined method, e.g. bandwidth utility and traffic volume.

The basic charging rate for VoIP

Destination		Rmb/min
Domestic		0.3
Hongkong, Macao, Taiwan		1.5
International	America, Canada, Korea, Japan, etc.	2.4
	India, Pakistan, vietnam, Iran, etc.	4.6
	Other Country and region	3.6

IPTV Service

- IPTV   as most data transmission, encodes the source TV program to the type fitting for transmission on Internet, and decodes the streaming and replays on the terminal. The access to the IPTV service is via PC or topset.
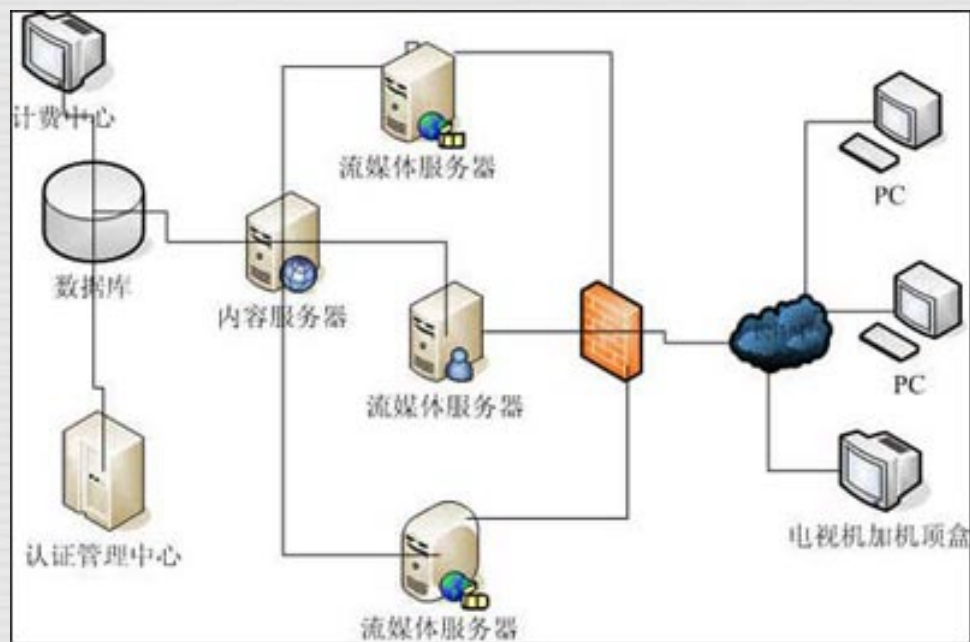
Charging methods for IPTV

- IPTV service is still at tentative stage, now it is charged by two ways,
    - For the common program on air (synchronized with cable TV), 30Rmb per month
    - For the demanded program, 1Rmb per episode.

- The billing and charging should satisfy various requirements;

- Billing and charging mode based on contents and according to services provided　not just only according to service's duration and traffic;

- More QoS elements should be considered;

- Due to multicast services broadly deployed,pushing the extensive use of 802.1x access control method.

Thank you for your attention