Third-party AAA and corresponding Charging and Billing of Services

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Outline

• Introduction
  • Consumer-Based Model (CBM)
  • Third-party Authentication, Authorization and Accounting (3P-AAA)
  • Third-party Charging and Billing (3P-C&B)
• COST ACROSS WG3-related challenge(s)

CBM techno-business model

New

3P-AAA: Service and Service Providers

• 3P-AAA-SP are new business entities
• Central role
• Goal
  – Separation of the administration and management of users’ AAA activity from the supply of a wireless access network service
• Status
  – Network-independent, autonomous, and trusted business entities
3P-AAA: Functional Model

3 Principle Interfaces between:

a) Consumer and TSP/ANP
b) Consumer and 3P-AnP

c) TSP/ANP and 3P-AAA-SP

At least 2 parallel Accounting streams exist

1) At least 1 for Service
2) 1 for Network Resource usage

3P-AAA Functional Model: COST ACROSS Relation

3 Principle Interfaces between:

a) Consumer and TSP
b) Consumer and 3P-AAA-SP

c) TSP and 3P-AAA-SP

3P-AAA: Accounting

Accounting Sequences:

1) Accounting Requests for network usage
2) Accounting Requests for service usage

3P-AAA: Accounting for Composite Services

Multiple Accounting Sequences:

1) Accounting stream for Network usage
2) Accounting stream for Service usage

3) Accounting stream for Value Added Service (VASP)
Integrated Accounting Service can be:
- Accounting is part of the Service Provision

Discrete Accounting Service:
- It is a separate service

Integrated Accounting Service is appropriate for 3P Teleservice Providers (TSP) Accounting is coupled with the Service

Inter-Domain Accounting
- 2 separately administered domains are involved
  - TSP / ANP
  - 3P-AAA-SP
- Accounting Policy exchange is needed between the service servers (Policy Pulling)

3P-AAA: Policy-based Accounting Model

1. AccPolRQ (Policy is requested from the 3P-AAA Server)
2. AccPolAns (3P-AAA sends the Accounting back)
3. AccRec (Accounting data sent from TeleService Provider (TSP) AAA server)

Step Function Description
1. AccPolRQ Policy is requested from the 3P-AAA server
2. AccPolAns 3P-AAA sends the Accounting back
3. AccRec Accounting data sent from TeleService Provider (TSP) AAA server

Identifying suitable 3P-AAA Accounting and Authorization model

The preferred type for 3P-AAA seems to be the Discrete Accounting Service because it is more flexible and generic

The Inter-Domain arrangement is a good basis for 3P-AAA usage
Defining generic 3P-AAA and 3P-C&B Architecture

3P-AAA: Accounting and Authorization (AA) Model

Agent Sequence
Pull Sequence
Push Sequence

3P-AAA: Accounting and Authorization Model Extended

- Agent Model
  - This allows that the original request can contain Accounting Policy Indication from the Mobile User (e.g., she wants flat rate for the service) and these could be regarded by the 3P-AAA Server.
  - 3P-AAA server keeps the Authorization and Accounting Policies
  - Teleservice Provider/Access Network Provider AAA Server gets the Accounting Policies from the 3P-AAA Server based on Business Agreements and the User Service Level Subscription
  - 2 phases to get the service: (a) AA-Request and if it's OK (b) Usage

- Pull Model
  - It goes very much the same features what were told for the Agent Model except possibility for Accounting Policy Indication with the original request
  - There is only one phase to get the service (no two phases as with the Agent Model)
  - It seems to be the typical scenario with 3P-AAA

- Push Model
  - This could be a useful scenario for composite services provided by different Teleservice Providers (TSP/TSP/.../TSP)

- Pull & Push models seem to be the main candidates for 3P-AAA usage.

Generic 3P-AAA Architecture: Pull Model

- Policy-based Accounting Model
- Accounting Policy exchange is needed between the AAA Servers (Policy Pulling)
- Inter-Domain Accounting between
  - Teleservice Provider or Access Network Provider
  - 3P-AAA SP

Accounting policies are stored on the 3P-AAA side and local AAA server enforces the 3P-AAA policies on the Service Equipment
Generic 3P-AAA Pull Architecture: Components

- 2 important components:
  - **Credit Control Server**
    - Located in the 3P-C&B domain
  - **Credit Control Client (3P-CCC)**: commissioned near or co-located to the Service Equipment in the TSP domain or to Access Network Resource in ANP domain
    - Generates CC protocol messages based on the Resource usage for which it has been commissioned
    - Would be a standard component of the 3P-C&B infrastructure
    - A couple of variants to cover some well defined Charging interfaces or reference points as input from the Resource side e.g.,
      - Ro
      - CAP

Generic 3P-C&B Architecture: Rating Scenarios

- **Class ‘A’ Rating**
  - Simple, unintelligent 3P-CCC
  - Every service unit usage authorized (rated & converted in monetary units & balance controlled) by the 3P-C&B Credit Control Server
  - **Advantage**
    - Simple 3P-CCC / simple CC-Protocol needed
  - **Disadvantage**
    - Every resource usage generates a CC-protocol RQ/ANS exchange
    - In session-based services, e.g. voice call, it could cause frequent long message exchanges between 3P-CCC and 3P-C&B CC Server, if these are located a long distance apart.
    - The latter could invalidate this option completely
Generic 3P-C&B Architecture: Rating Scenarios

- **Class 'B' Rating**
  - Intelligent 3P-CCC
    - Rating rules downloaded (tariff) from the server or stored locally (the set-up happened at 3P-CCC commission and maintained locally)
    - User account data relevant for rating retrieved by 3P-CCC
  - 3P-CCC creates CC-protocol requests only for monetary unit reservations
  - 3P-CCC uses its monetary reservations to authorize service unit usages (more than one with a good reservation scheme)
  - Service unit usage authorized (rated & converted in monetary units & balance controlled) from the monetary reservations currently made
  - If needed, new CC-Protocol request is made for new monetary units
  - At the end of the Resource usage, the reservations is being confirmed to 3P-C&B Credit Control Server and this leads to Account Controlling on User’s balance

- **Advantages**
  - Less messaging roundtrips between SP/ANP and 3P-AAA-SP
  - Rating Rules can be locally set & maintained

- **Disadvantages**
  - A bit more complicated CC-Protocol (User data is needed from CC-Server)
  - Intelligent 3P-CCC is needed

COST ACROSS WG3-related Challenge(s)

- Smart, context-dependent, dynamic pricing, and corresponding charging and billing of composite service
  - Pricing & C&B of composite services, provided to the end user by different service providers (SPs)
  - Require elaboration of new mechanisms and techniques in order to facilitate ‘always best servicing’ (ABS) of the user, depending on their current context.
  - Linked to the dynamic monitoring of the quality of each component of the composite service, with an ability to dynamically replace/substitute the component(s) that is/are currently underperforming with another one(s), which is/are identified as working better in the current context.
  - The replacement of service components must be performed transparently to the user – perhaps with the user only noticing improvements in the overall service quality who must, at the end, be supplied with just one itemized bill for the service usage, provided by a TTP 3P-CCC entity.
  - The TTP feature of this entity will also facilitate the initial establishment of trust and subsequent interaction, e.g., to ensure interoperability, between different SPs as regards the services (service components) provided by each of them.
  - This challenge relates also to the service IDSS (intelligent demand shaping) and service MAP (measurement, analytics, profiling).

CBM: Strength with 3P-AAA-SP & 3P-C&B Approach

- Delivers fast innovative environment for service creation
  - Service Providers (ANP, TSP, VASP) do not need to invest in their own Charging & Billing (C&B) system
  - Service Providers can focus better on their services
  - Service Providers get the C&B System for free
  - Newly created Services (Access Network or Teleservice) automatically exposed to Consumers after their registration with the 3P-AAA-SP

- Delivers a ‘fair 5G system’
  - Consumer chooses which Service Provider (ANP/TSP/VASP) and which Service she is going to use (in that point of view, every Service Provider has equal chances!)
  - Consumer can freely seek for ‘value for money’ services

- Helps to create sophisticated C&B systems
  - 3P-AAA Service Providers can invest in their C&B Services (for new charging schemes or flexible charging solutions) and these will automatically be available for every Service Provider and this would certainly result in more interest and more new clients

Conclusions

- Suitable policy-based Accounting Models for 3P-AAA looked through
  - Discrete Accounting is the most flexible to create new Accounting Services
  - Inter-Domain Accounting is a good basis for 3P-AAA usage

- Possible Accounting and Authorization framework for 3P-AAA, based on expected main interaction scenarios, looked through
  - Pull & Push models identified as main candidates

- Generic 3P-AAA Architecture defined
  - Generic 3P-C&B Architecture defined

- 2 main scenarios for Rating identified

- COST ACROSS WG3-related Challenge(s) identified
End

Thank you

Questions & comments?

“Third-party AAA and corresponding Charging and Billing of Services”

was presented by

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