Accounting, Charging and Billing for NGN Services and Network

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Outline

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Motivation

Traditional Telecommunications and Internet services have
- Relatively simple charging and billing mechanisms such as duration-based and flat-rate

NGN includes a variety converged multimedia services in its scope such as
- Interactive-based Services
- Non Interactive-based Services
- Network Services
- Regulated Services

Such diversity leads into new requirements
NGN Business Model Evolution

- Includes messaging, gaming, location-based services, videoconferencing, MoD/VoD, VoIP, other QoS-based services
- Contents includes stock quotes, news, music, video, movie, etc.
- Services resold through various partners

- Access and Transport Market with simple voice and data services
  - Saturated
  - More Competition
  - Margins declining

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NGN Charging Model Evolution

- Bill based on:
  - Duration, time of day
  - Data volume
  - Web site accessed
  - Quality of Service (QoS)
  - Per Flow
  - Per event
  - Per e-mail
  - Retail purchase
  - Per ad

- Bill based on duration, time of day, Flat-rate

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Related Standard Efforts

ITU
- SG3
  - Defines charging, tariff and settlement policies for PSTN and International Internet Interconnectivity
  - Recently chartered for NGN aspect
- NGNFG & SG13
  - Defines charging and billing requirements and functional capabilities for NGN

3GPP
- Defines a series of charging standards for mobile services such as 2G, 3G, IMS, WLAN, etc.

IETF
- AAA
  - Defines AAA protocols and related information models
- IPFIX
  - Defines IP flow information export protocols and information model

IPDR
- Billing industry leaders define common IP Charging Data Record
3GPP Charging Architecture & Information Flow
ITU-T SG3 Activities

- PSTN and Mobile telecommunications services related charging and tariff policies defined in various D-series recommendations
- Settlement policies among international Internet Service Providers defined in D.50
- NGN rapporteur group is created in the January 2005 meeting to deal with NGN charging policy and regulatory issues
IPDR

IPDR.org chartered for defining common IP service detail record

Source: IPDR.org Telemanagement world, Oct. 2001
Requirements

- Defined in “NGN Release 1 Requirements for Services and Capabilities document” of NGNFG
- The NGN shall provide accounting functions, off-line (i.e. post processing) and on-line charging (i.e. charging during the session)
- Open mechanisms should be available for charging and billing management
- Various charging and billing policies should be supported (e.g. fixed rate charging and usage based per-session charging and billing)
- Appropriate accounting functionality is necessary even when the multicast functionality is used
- The NGN should enable all possible types of accounting arrangements, as well as billing (between providers)
NGNFG FRA defines
Charging Capabilities

- **Charging Trigger Function**
  - generates charging events based on the observation of network resource usage

- **Charging Collection Function**
  - receives charging events from the Charging Trigger Function. It then uses the information contained in the charging events to construct Charging Data Records (CDRs)

- **On-line Charging Function**
  - receives charging events from the CTF and interacts in near real time to provide authorisation for the chargeable event / network resource usage requested by the user

- **Rating Function**
  - determines the value of the network resource usage (described in the charging event received by the OCF from the network) on behalf of the OCF

- **Account Management Function**
  - the location of the subscriber’s account balance within the Online Charging System
Further Requirements

- Common Charging Data Information Model for NGN shall be needed
- Efficient, reliable, secure interfaces and protocols between network elements and accounting elements and between accounting elements in NGN shall be needed
- Appropriate accounting functionality to support various NGN services shall be needed. Such functionality includes but not limited to:
  - Per user-session record usage statistics
  - Per macro-flow usage statistics
  - Per micro-flow usage statistics
  - Inter-provider flow usage statistics
- Management functionality for the seamless operation of the accounting, charging and billing functional elements should be available
Example NGN Services

- Which may require new accounting, charging and billing capabilities

Collaborative interactive communication services: support of multimedia conferencing with file sharing and application sharing
  - Consists of multiple heterogeneous sessions: voice, video, file transfer, applications sharing interactivity
  - They are integral parts of the collaborative service which requires combined billing of multiple heterogeneous sessions
  - Charging parameters include duration, data volume, QoS, flow, content, and others
  - It is no longer that simple to rely on either flat-rate or duration-based charging policy although it is still possible if no alternatives exist

International interactive TV on demand including mobile terminal users
  - Introduces very complex billing environment due to the multiple SP (mobile and fixed NSPs spanning national boundaries and content providers) involved
  - Requires various charging arrangement policies including inter-SP settlement

Inter-SP settlement for NGN services
  - Traditional duration-based method for voice telecommunications services and peering (free) or transit (one part pays 100%) model may not fit for NGN environment
  - May require new charging arrangement
Standard Issues

- Service and functional requirements
- Generic and functional architectures for accounting, charging, and billing
- Accounting and metering capabilities of various levels of information
  - Duration only
  - Volume only
  - Flow-aware volume
  - Contents level
- Service specific charging data info model vs service independent generic model
  - Charging data info model for customer
  - Charging data info model for inter-SP settlement
- Charging data export functional capabilities and protocol
- Inter-SP settlement functional capabilities and protocol
- Applicability scenarios of these capabilities
- Management and security of accounting, charging and billing elements
Policy and Regulatory Issues

- Charging and billing functional capabilities are not independent from related policy and regulatory issues.
- It is especially sensitive due to its monetary nature.
- Also terms and definitions used in NGN technical recommendations need clear common understanding, e.g., service.
- This requires close inter study group cooperation.
Conclusion

- NGN introduces new services whose billing mechanisms may not fit with the existing ones.
- These issues have been addressed by the leading industry consortium and various standard bodies in a limited scope.
- Some new requirements and functional capabilities were introduced.
- Some example NGN services which may require such new capabilities were described.
- Outstanding standard issues were discussed.
- Need to identify gaps and fill them with required new standards. This includes policy and regulatory issues.