Accounting, Charging and Billing for NGN Services and Network

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Outline

- Motivation

- Related Standard Trends

- Requirements

- Functional Capabilities

- Example NGN services requiring new Capabilities

- Standard Issues

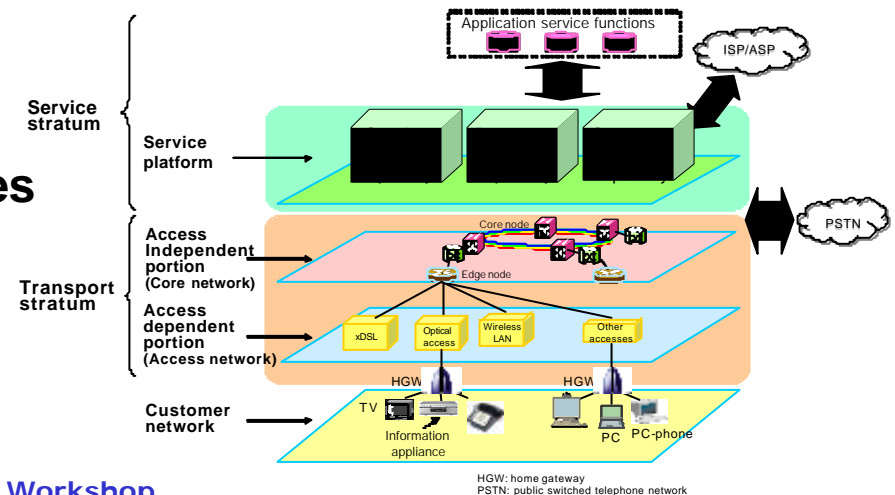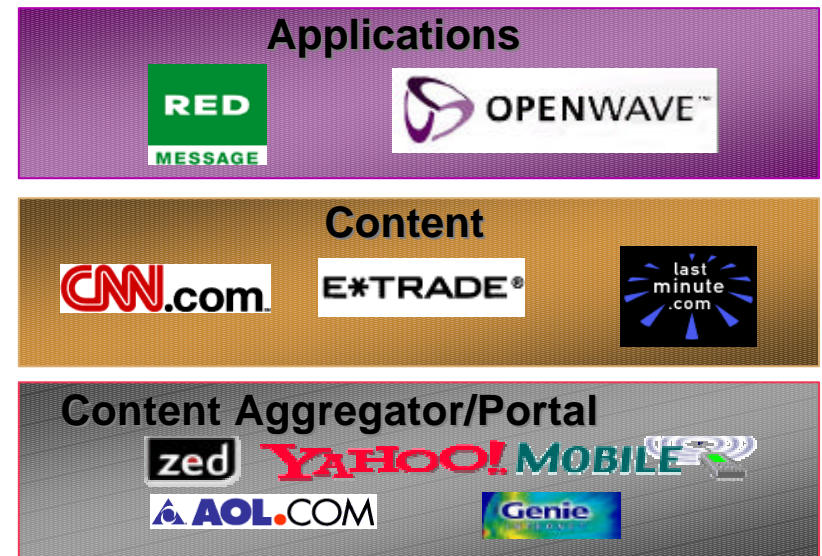- Conclusion

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

The Value Chain Evolves

- **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*
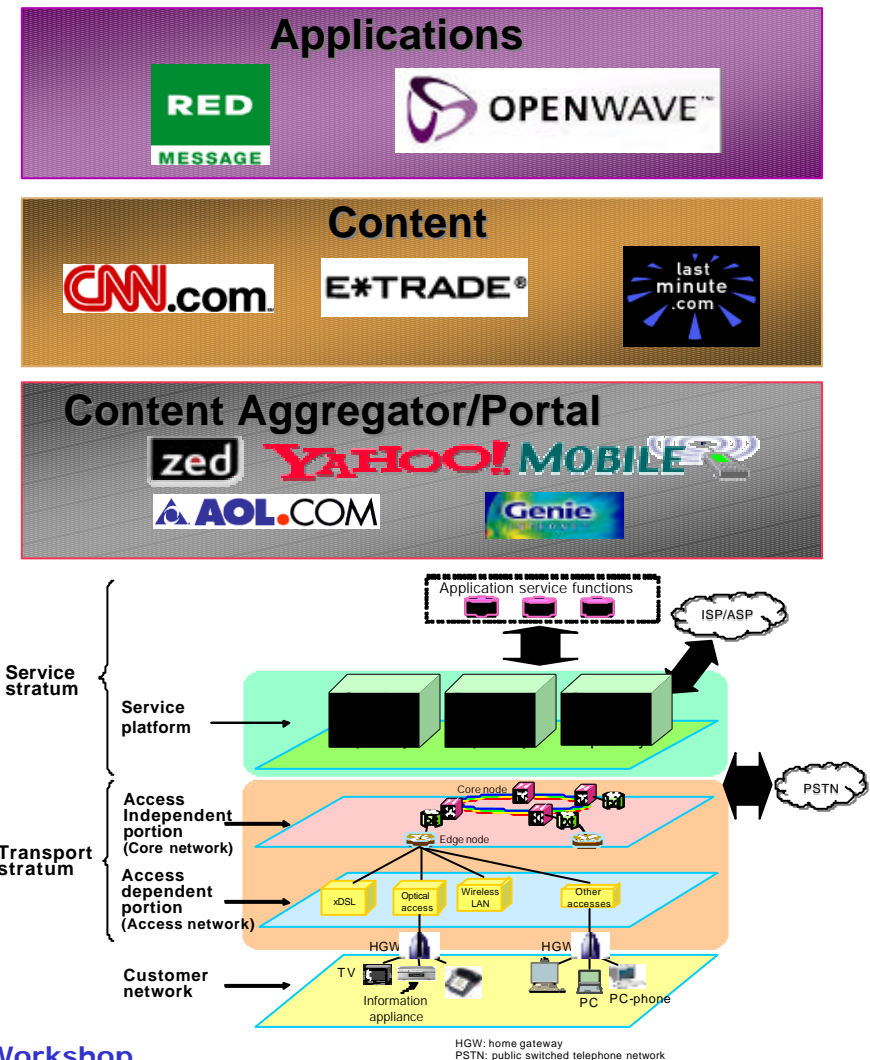 - *More Competition*
  - *Margins declining*

Applications

Content

Content Aggregator/Portal

NGN Charging Model Evolution

Charging Model Evolves

- **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**

Applications

RED MESSAGE   OPENWAVE™

Content

CNN.com   E*TRADE®   last minute.com

Content Aggregator/Portal

zed   YAHOO! MOBILE

AOL.COM   Genie

Application service functions   ISP/ASP

Service stratum — Service platform

Access Independent portion (Core network) — Core node — Edge node — PSTN

Transport stratum

Access dependent portion (Access network) — xDSL, Optical access, Wireless LAN, Other accesses

Customer network — HGW — TV, Information appliance, PC, PC-phone

HGW: home gateway
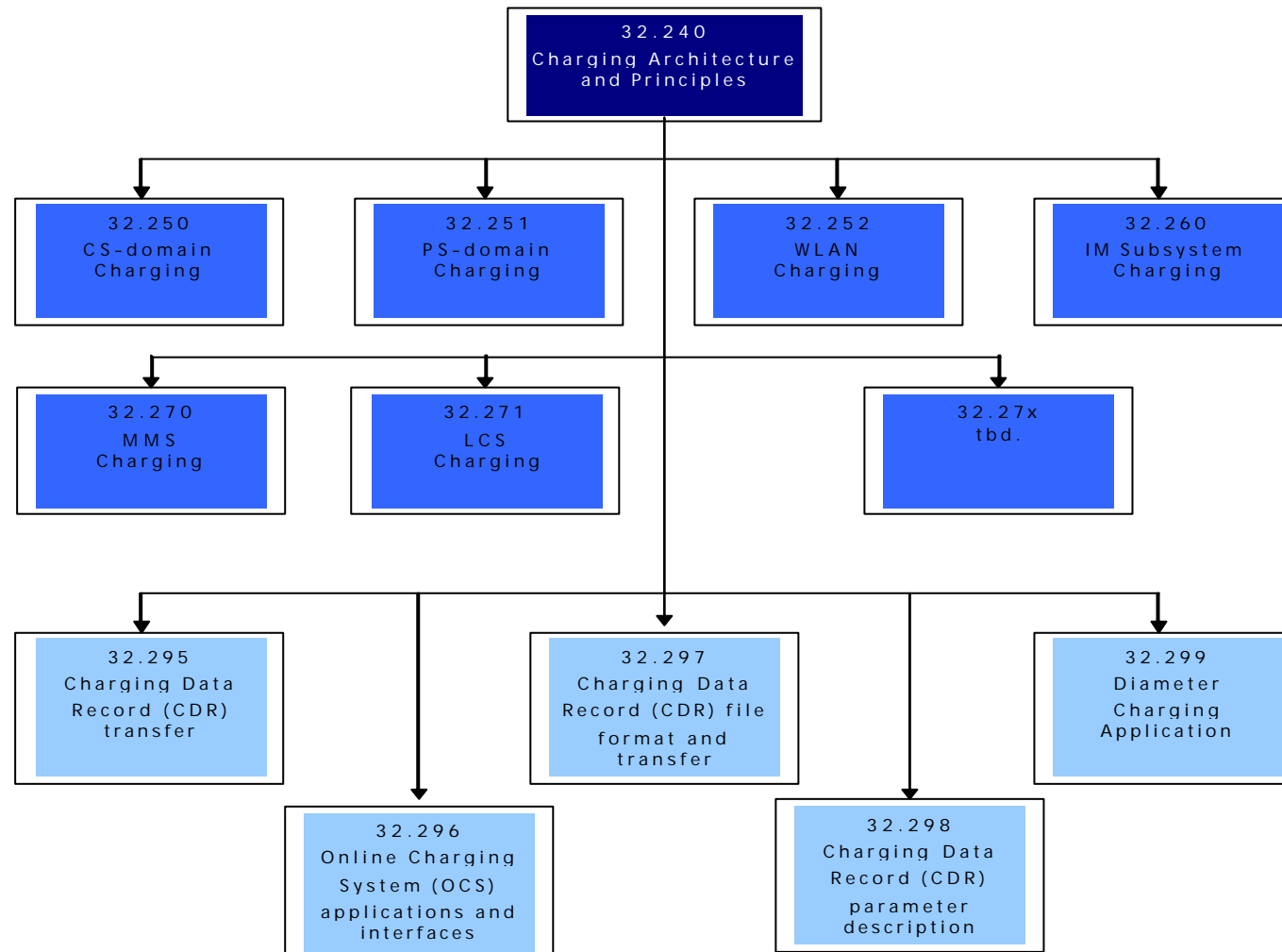PSTN: public switched telephone network

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
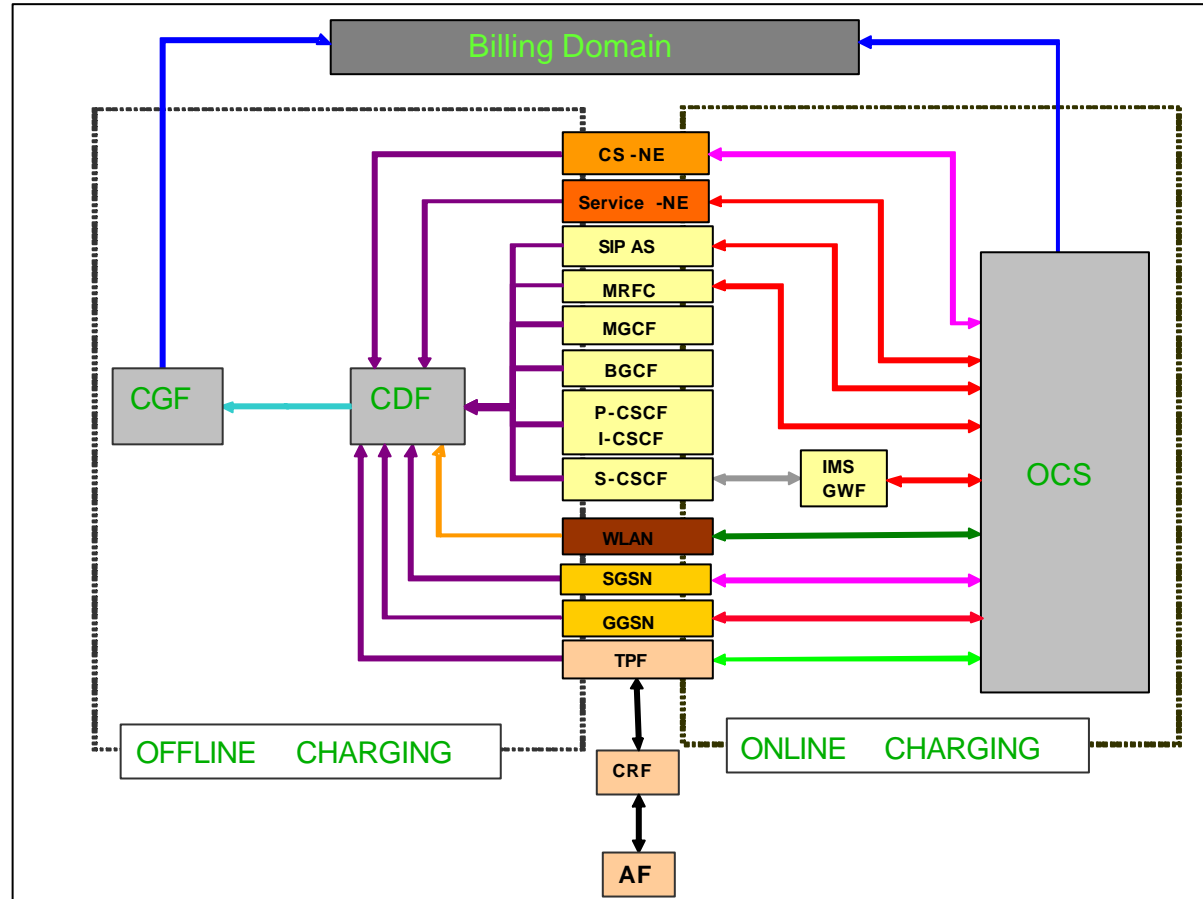 - Billing industry leaders define common IP Charging Data Record

3GPP Charging Documents

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                          ┌─────────────────────────┐
                          │        32.240            │
                          │  Charging Architecture   │
                          │     and Principles       │
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32.250 CS-domain Charging	32.251 PS-domain Charging	32.252 WLAN Charging	32.260 IM Subsystem Charging

32.270 MMS Charging	32.271 LCS Charging	32.27x tbd.

32.295 Charging Data Record (CDR) transfer	32.297 Charging Data Record (CDR) file format and transfer	32.299 Diameter Charging Application

32.296 Online Charging System (OCS) applications and interfaces	32.298 Charging Data Record (CDR) parameter description

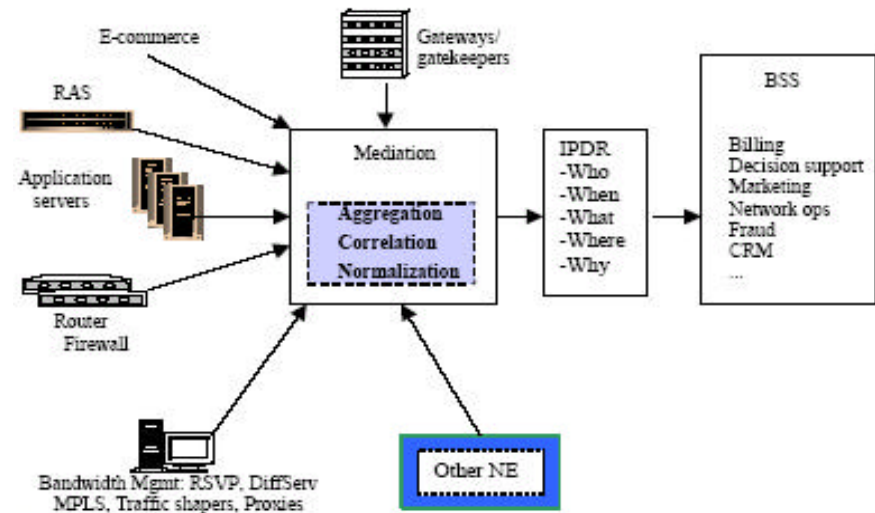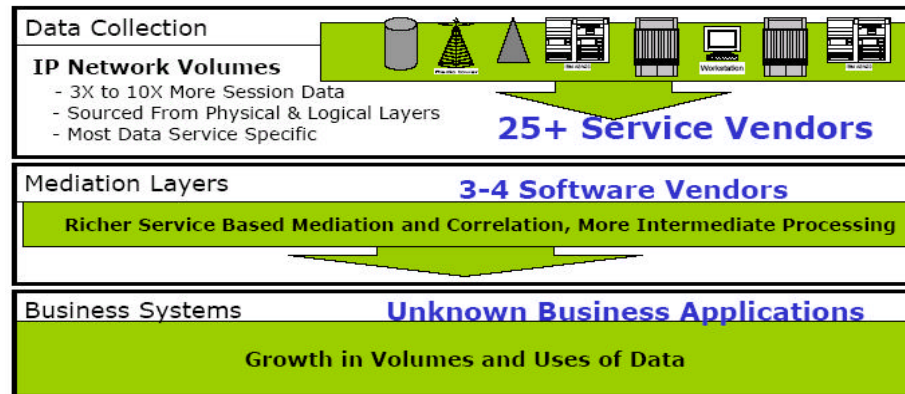# 3GPP Charging Architecture & Information Flow

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 rapparteur 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

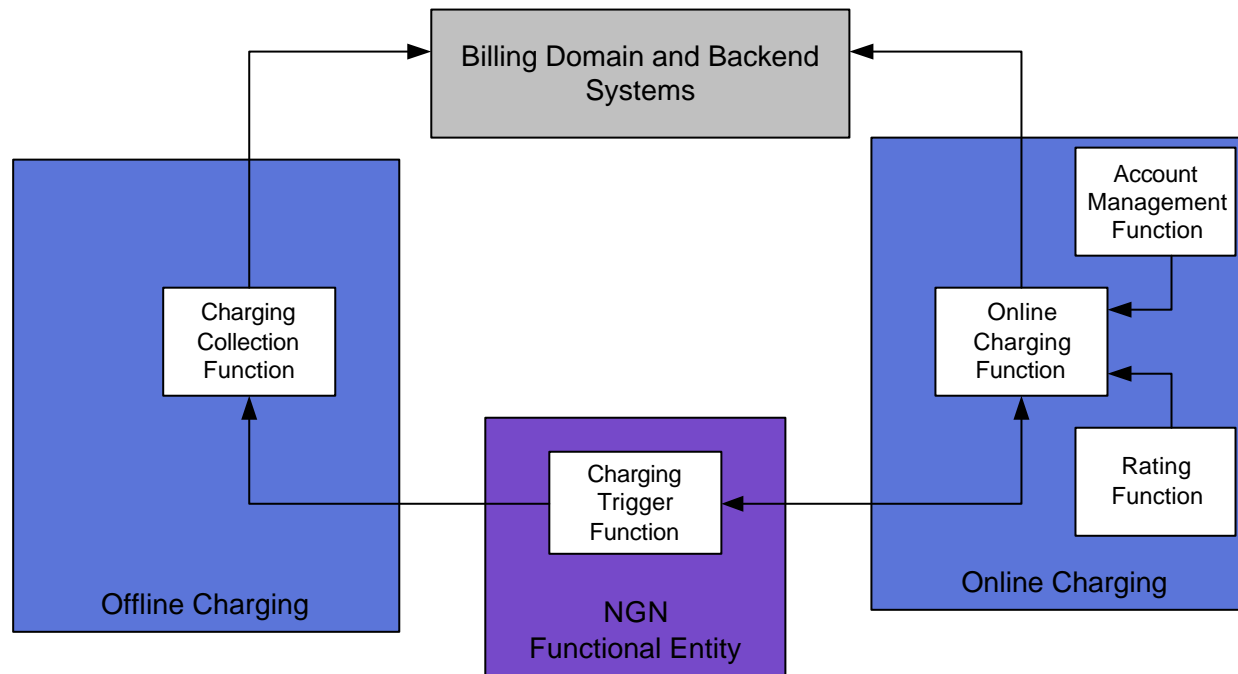Source: IPDR.org Telemanagement world, Oct. 2001

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)

Charging & Billing Functional Entities

🌐 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