



## QUALITY of SERVICE DEVELOPMENT GROUP (QSDG)

### Seminar on “Quality of Service & Customer protection”

### Setting QoS measures/requirements for services in an IP (NGN) environment

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QSDG Chairman

Geneva, 31 August – 1 September 2006



## QSDG

- o The Quality of Service Development Group (QSDG), which is in nature an operational group including a field trial group, was created in the Study Group 2 organisation in 1984.
- o From the formal point of view, QSDG is directly associated with Study Group 2. Not only is the QSDG an integral part of the Question with which it is linked, but also in practice the development of Recommendations under the Question follows directly from the experiences shared and contributions submitted at meetings of the QSDG.

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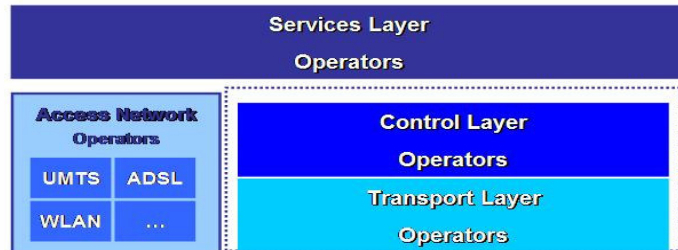
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## THE Business Specialization

### The Business Specialization

→ Multiple operators and suppliers offering solutions interact to supply service for customers

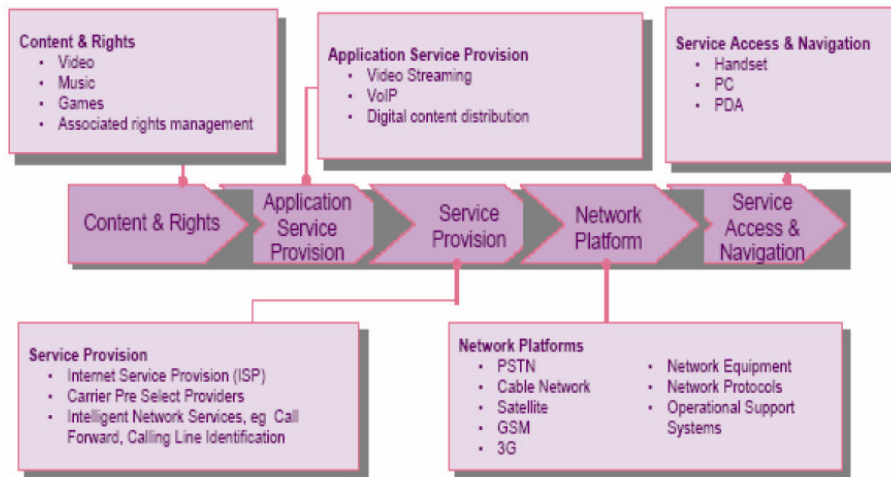


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## NGN Telecommunications Value Chain



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## "Regulatory aspects of QoS with regard to IP and NGN"

- Increasing the role of Regulators in the QoS regulation does not serve for interest of market. If the market exists, than the competition provides for the quality. Only, in the case of monopolium justified to increase the control of Regulation on the QoS of telecommunication services
- Avoid mistakes impacting customers as:
  - e.g. Defining terminating rates without looking the consequences
  - e.g. Allowing piracy services as SIM boxes (illegal interception)
- *"Regulators ... must not stand in the way of consolidation"*
- *Regulators to be clear where strictly necessary...  
... otherwise 'hands off'*

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## "Regulatory aspects of QoS with regard to IP and NGN"

- To IP and NGN "New" Regulatory concept is needed:
  - Technological neutrality
  - QoS needs have to be reflected in access interconnection regulations
  - Non-discriminatory access to infrastructure and services of competitors
  - Maintenance of traditional services whilst not hampering development of new infrastructures and services
- Regulatory objectives are in principle the same, but QoS aspects - as a new factor - have to be incorporated into the regulatory framework

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## Quality of Experience

**Quality of Experience** can be defined as the characteristics of the sensations, perceptions, and opinions of people as they interact with their environments. These characteristics can be pleasing and enjoyable, or displeasing and frustrating. In the current context, QoE is the end result of the interaction of people with collaboration technologies and distant partners, and ensuring a good experience is the goal when high user satisfaction is desired. Thus, QoE is how the user feels about how an application or service was delivered, relative to their expectations and requirements. QoE can mean different things for different applications.



## QoE/QoS

QoE

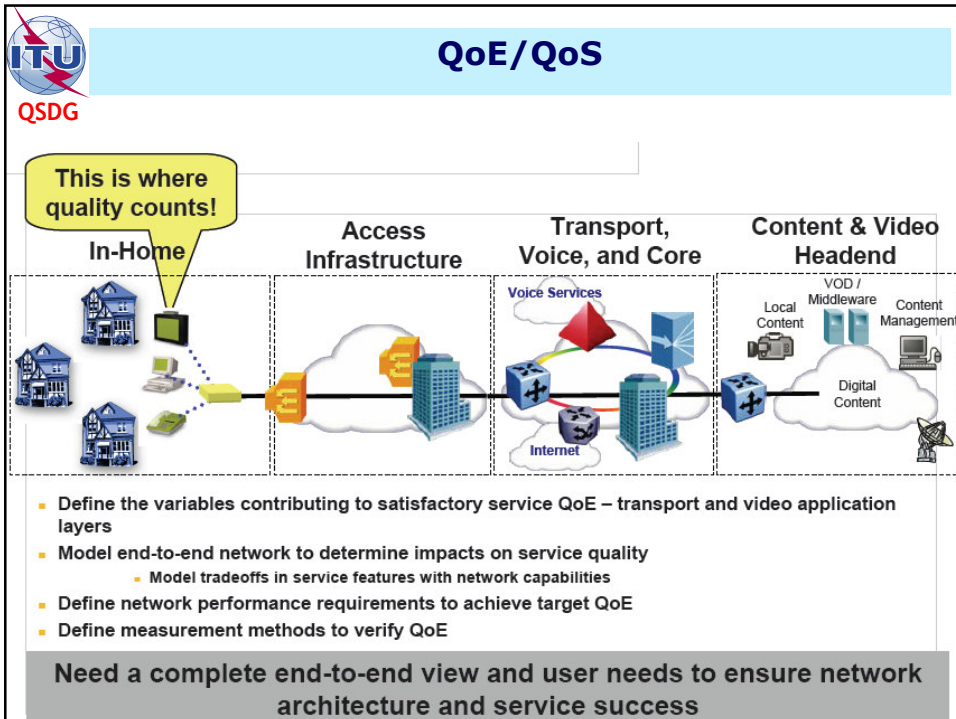
Quality of Experience (QoE) describes the performance of a device, system, service, or application (or any combination thereof) from the *perspective of the user*.

- QoE measures how well a network service satisfies the user's expectations and needs

QoS

Quality of Service (QoS) refers to a set of technologies (QoS mechanisms) that enable the network administrator to manage the effects of congestion on application performance as well as providing differentiated service to selected network traffic flows or to selected users.

- QoS mechanisms do not create bandwidth but instead manage available bandwidth more efficiently, especially during peak congestion periods



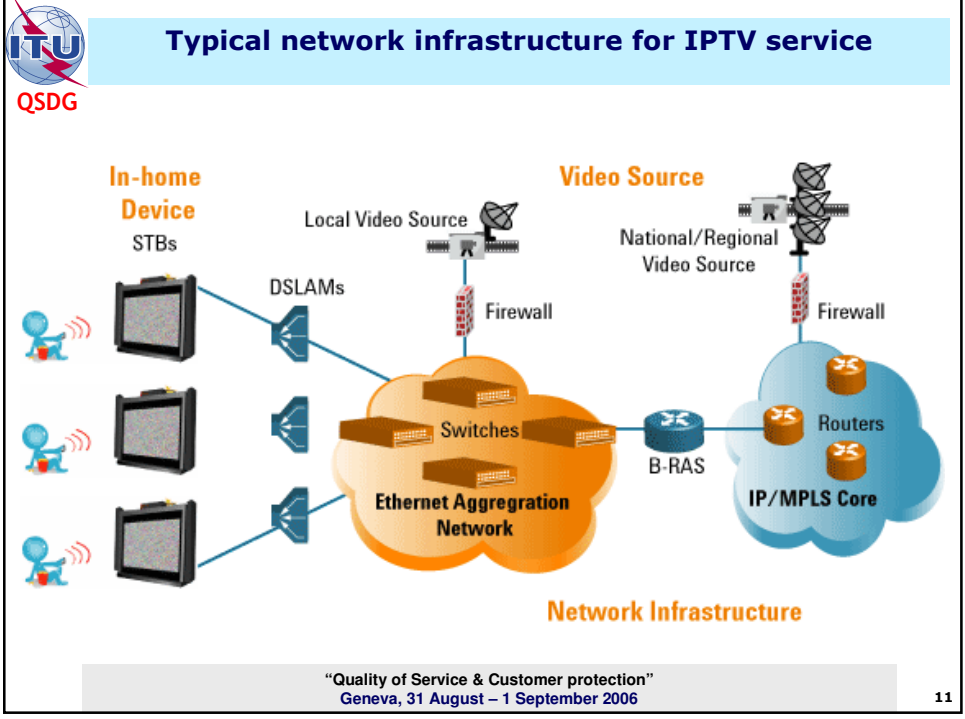
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## EXAMPLE of QoE

- End user experience of service quality is critical to the success of a service provider's IPTV deployment program. Video transport creates new challenges for IP networks:
  - Dominant multicast traffic requires upgrades to routers;
  - DSLAMs need IGMP snooping for bandwidth efficiency;
  - B-RASs have to authenticate subscribers.
  - Core network High Availability is critical for video;
  - Access networks must be QoS-enabled; and
  - Video servers should be robust and firewall-secured

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- IPTV QoE**
- o There are four technical factors that influence QoE (Quality of Experience):
    - Video and Audio media Quality,
    - Security,
    - Reliability, and
    - Channel Zapping Delay.
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## Perceived quality of channel zapping

- Important issue for IPTV QoE
- Channel change delay needs to be  $<0.4s$  for acceptability

## QoS interactions between services on ADSL

- IPTV pixelating because somebody is playing on-line game at same time
- Video is pixelating because a PC runs a P2P file upload
- TV channel changing time slows down when a phone call is made (too much services already running)
- ...
- Due to bandwidth shared between services
- Need of MOS for audio & video component
- Need of new types of KPIs/KQIs



Pixelating



Blur



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## Service Quality is More Than Video Quality

- **Service Quality Management Challenges for IPTV**
  - Allocating the appropriate amount of bandwidth for high profile and high usage channels
  - Balancing compression and bandwidth limitations
  - Ensure speed of IGMP Joins and Leaves
  - Validation of services delivered to the customer
  - Correlation of IGMP, RTSP or HTTP control plane and the media delivered
  - Ensuring VoD source content has quality commensurate with agreements with content providers
  - Validating the quality of the video stream delivered to the network in comparison with that delivered to the customer



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## "IPTV QoE requirements"

- Need a complete end-to-end view of performance of a system from the perspective of the *user* to ensure service success
- The IP packet loss is by far the most important network transport parameter to affect IPTV service quality
- Error recovery offers possibility to extend reach of ADSL/ADSL2+ and meet QoE target

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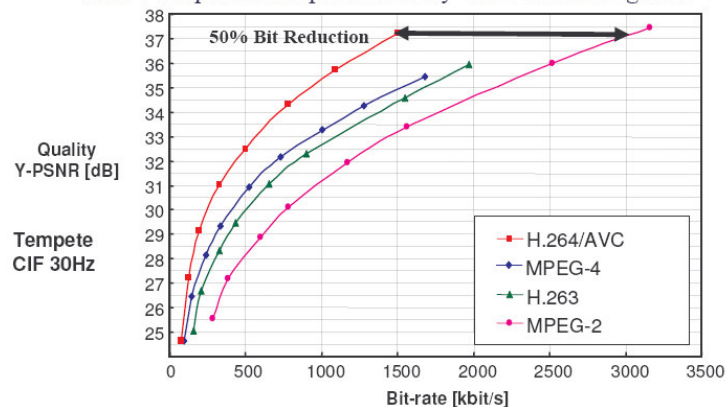


## QoE aspects of video conferencing services

- o Recent ITU standards have significantly enhanced videoconferencing QoE
- o H.264 delivers significant video coding gain;
- o G.722.1 Annex C super-wideband coding delivers improved audio intelligibility and transparency
- o H.460.18 & 19 NAT/firewall traversal recommendations finally solve the NAT firewall traversal problem and open up enterprise-to-enterprise video communication
- o Call set-up acceleration will enhance QoE
- o Dual video channels - best feature of the decade!

## H.264 versus MPEG-2/4 & H.263

- ITU-T
- H.264 doubles the compression of MPEG-2
  - H.264 ubiquitous adoption in every video market segment





## RECOMMENDATIONS

- With communication and media consumption, the best QoS is the one you don't notice
- Customers want to focus on communication (e.g. in a video conference) or the experience of consumption (e.g. watching a music clip); any noticeable degradation is a distraction (= violation of expectations)



## IMPROVING SECURITY Quality and Security Usability

- The user is a key component of any security system
- Blaming the user will not lead to more effective security systems
- Must be easier to use security systems than to bypass them



## Improving security - Regulatory Reforms

### Improving Security

- o **Communication** ⇒ Need to ensure right balance between
  - technological development,
  - self-regulation and
  - *regulatory measures*
  
- o **Regulatory measures proposed:**
  - Oblige operators to take security measures and grant powers to NRAs to monitor the technical implementation
    - Authorise NRAs to require information from operators, to require mandatory audits and to **sanction companies** not complying with security requirements (possibility of fines!).
  - Require **notification of security breaches** and loss of personal data to NRAs and customers
  - Modernise provisions on network integrity, by extending integrity requirements beyond PSTN to mobile and IP networks



## End-point devices

### Trends ...

### Proliferation of end-point devices



| PHYSICAL INTERFACES   | WIRELESS INTERFACES   | REMOVABLE STORAGE  |
|---|---|--|
| <ul style="list-style-type: none"> <li>oUSB</li> <li>oFireWire</li> <li>oPCMCIA</li> <li>oSerial</li> <li>oSD</li> <li>oParallel</li> </ul> | <ul style="list-style-type: none"> <li>oWiFi and Broadband</li> <li>3G/2.5G/2G wireless</li> <li>oBluetooth</li> <li>oInfra Red (IrDA)</li> </ul> | <ul style="list-style-type: none"> <li>oCD / DVDs</li> <li>oFlash Drives</li> <li>oZip Drives</li> <li>oFloppy Drives</li> <li>oTape Drives</li> </ul> |



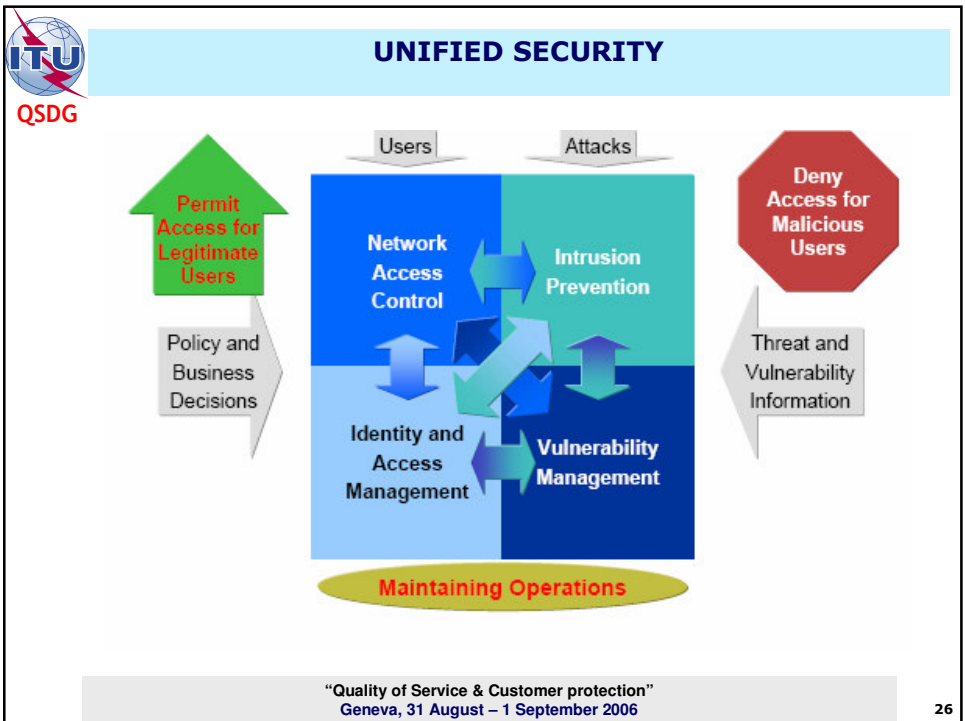
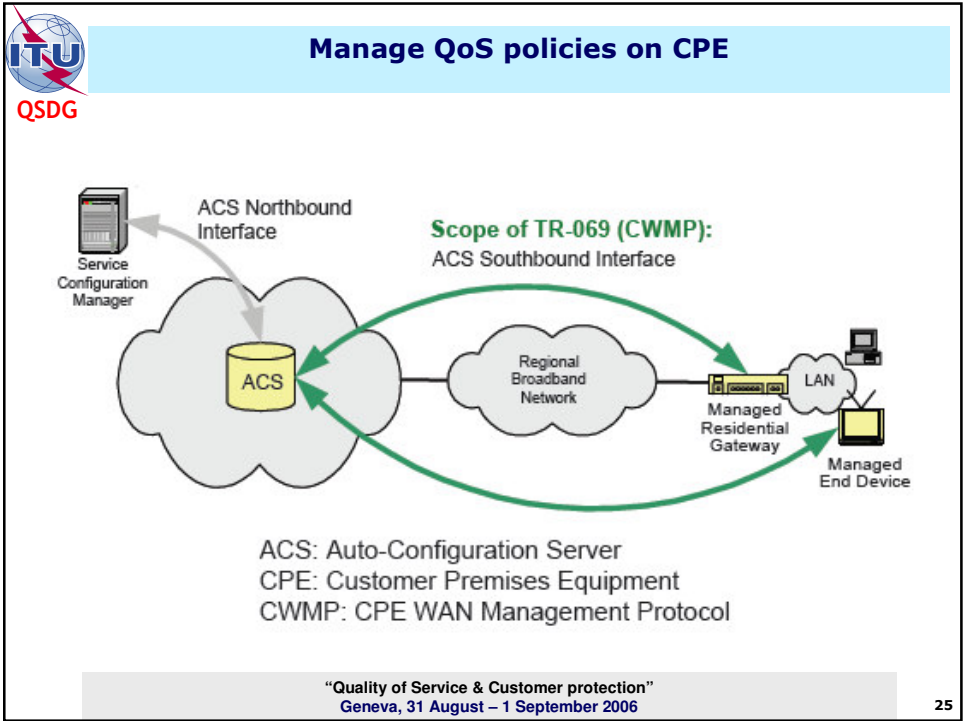
## End-point Security

- A real emerging threat.
- Must not be ignored.
- Real and huge financial liability if not confronted effectively.
- Is getting more serious attention in the industry.
- Solutions are evolving.



## "The TR-069 protocol and its ability to manage QoS policies on the CPE"

- Customer premises equipment (CPE) have become an integral part of service platforms in NGN networks: consequent need for a management protocol to be used by service and network providers
- TR-069: protocol family developed by DSL Forum but not specific for DSL deployments: it is technology agnostic
- Main functions: dynamic service provisioning, software/firmware management, status and performance monitoring, diagnostics
- Monitoring of QoS performances not yet widely developed: standardisation is encouraged also in this field since it promotes interoperability
- Need to assure the security of sensible users' data in order to guarantee privacy (aspect particularly relevant for regulators)





## Standardisation issues

- Global Coordination of Standards for NGN VoIP terminals and gateways to achieve a unique set of QoS Requirements for VoIP Terminals (coordination already in place for NGN networks standardisation)
- Standardisation of monitoring methods of QoS performances based on the TR-069 protocol family (aimed at promoting the wider interoperability of IP multimedia services and platforms)



## Contracts /SLAs

- When a consumer subscribe to services providing connection and/or access to the public telephone network, he/she has the right to a contract with the following elements, at least:
  - The identity and address of supplier
  - Services provided, the service quality levels offered, as well as the time for the initial connection.
  - The types of maintenance service offered
  - Details of the prices and tariffs and how to obtain up-to-date information on all tariffs and maintenance charges
  - The duration of the contract along with the conditions for renewal or termination of the services and of the contracts itself
  - Details of applicable compensation or refunds if the quality of service levels specified in the contract are not met, and
  - The method of initiating procedures for settlement of disputes.



## **“Regulatory aspects for Quality of public communication services”**

- The subscriber shall have the right to obtain uninterrupted, efficient and on time provision of all public communication services which may be utilised to his terminal equipment compatible with the technological development of the operator /service provider capacities
- The operator/service provider shall provide qualitative and uninterrupted service utilization



## **Draft new ITU-T Rec. E.802**

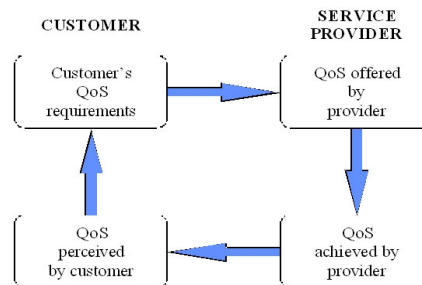
Framework and methodologies for  
the determination and application  
of QoS parameters

### Intention of E.802

- **Creation of a consistent and ready to use framework for the identification of user QoS criteria and determination of respective measurable QoS parameters**
- **Guidance on how to set-up measurement methodologies for QoS parameters**
- **Process for defining quality objectives/target values and their verification**
- **Providing additional information on existing applicable standards**

### Background/scope of E.802

- **Based on 'QoS Requirements of the User', one of the four viewpoints of Rec. G.1000**







## Draft new ITU-T Rec. E.802

### Background/scope of E.802

- **Specifying the level of quality of service in customer telecommunication service contracts or in the description or terms and conditions of the service.**
- **Comparing the level of quality and quality commitments of services of different service providers.**
- **Preparing long-term studies on the level of quality attributes of a specific service.**
- **Preparing statistics, reports and publications of the quality of a service.**
- **Regulatory purposes including specification of minimum level of quality (e.g. for universal service, interconnection regulations) and monitoring of services by e.g. reports on a regular basis and statistics for specific situations.**

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## CONCLUSIONS/RECOMMENDATIONS

- Understanding customer expectations for QoE is a key factor in introducing new services
- Good perceived QoE requires exceeding customer expectations
- Customer expectations are influenced by cost/charging, and available alternatives
- Need more fundamental data from subjective tests in order to define QoE requirements for new services

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# THANK YOU

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