ITU Workshop on Performance, QoS and QoE for Multimedia Services
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QoS and QoE aspects
of Digital Financial Services

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Situation

- ITU-T Focus Group on Digital Financial Services
- http://www.itu.int/en/ITU-T/focusgroups/dfs/Pages/default.aspx
- Has endorsed the report on QoS and QoE Aspects of Digital Financial Services
- http://www.itu.int/en/ITU-T/focusgroups/dfs/Documents/09_2016/FGDFSQoSReport.pdf
    - This Technical Report was written by Joachim Pomy and Wolfgang Balzer
    - Special thanks to Jan Holub and Peter Pocta for their helpful review and contribution
- The following slides are based on this report

- ITU-T FG DFS is now closed
- Work on QoS & QoE of DFS is carried on in the Financial Inclusion Global Initiative (FIGI)

Agenda

- Some Definitions
- Mobile Terminals for DFS
- Network KPIs
- Network Provider ≠ DFS Provider
- Fitness for DFS
- User-centric KQIs
- Conclusions & Way Forward

Quality of Service (QoS)

- **Quality of Service (QoS)**
- Totality of characteristics of a telecommunications service that bear on its ability to satisfy stated and implied needs of the user of the service.

Quality of Experience (QoE)

- **Quality of Experience (QoE)** is the degree of delight or annoyance of the user of an application or service. [Qualinet2013]
- Note – Recognizing on-going research in this topic, this is a working definition which is expected to evolve for some time. (This note is not part of the definition.)
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- **Bibliography**
- [Qualinet2013]   Qualinet White Paper on Definitions of Quality of Experience, Output from the fifth Qualinet meeting, Novi Sad, March 12, 2013

QoE Influencing Factors

- **QoE Influencing Factors** include the type and characteristics of the application or service, context of use, the user's expectations with respect to the application or service and their fulfilment, the user's cultural background, socio-economic issues, psychological profiles, emotional state of the user, and other factors whose number will likely expand with further research.

QoE Assessment

- **QoE Assessment** is the process of measuring or estimating the QoE for a set of users of an application or a service with a dedicated procedure, and considering the influencing factors (possibly controlled, measured, or simply collected and reported). The output of the process may be a scalar value, multi-dimensional representation of the results, and/or verbal descriptors. All assessments of QoE should be accompanied by the description of the influencing factors that are included. The assessment of QoE can be described as comprehensive when it includes many of the specific factors, for example a majority of the known factors. Therefore, a limited QoE assessment would include only one or a small number of factors.

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Mobile Terminals

- QoS aspects of DFS need to be assessed for two different use cases:

- In use case #1 the targeted group of users of such service is limited to the use of (cheap) basic feature phones. This excludes for example browser-based DFS solutions.

- In use case #2 the additional QoS aspects are assessed when the minimum requirements to the phones used for DFS are raised and basic smartphone functionality can be assumed.
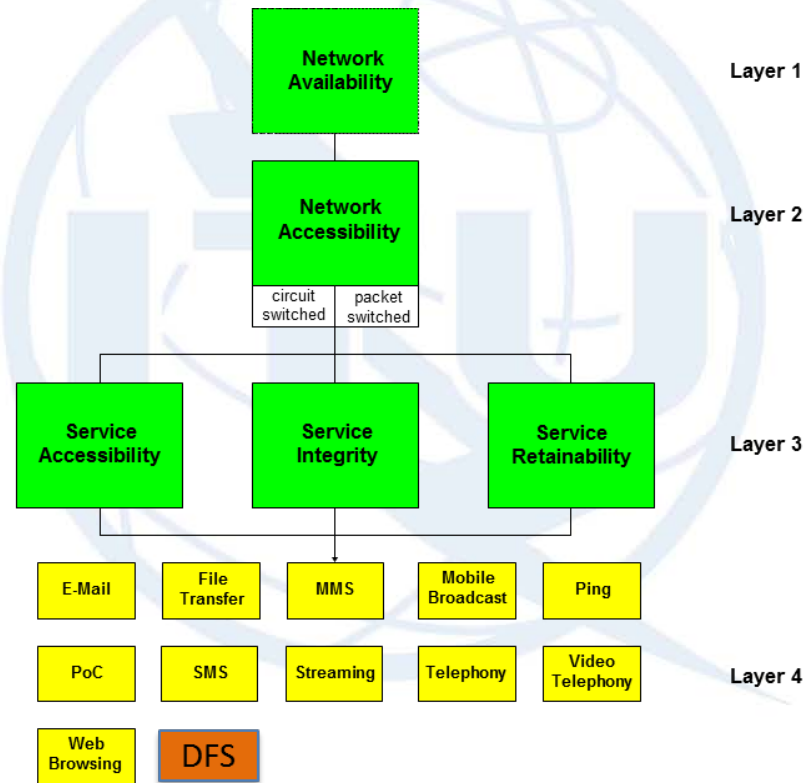
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QoS aspects of Mobile

Unstructured Supplementary Service Data (USSD)

- USSD service non-accessibility [%]
  - Target: 2% - 1% - 0.5% ?
- USSD completion failure ratio [%]
  - Target: 1% - 0.5% - 0.1% ? Or even 0% ??
- USSD end-to-end delivery time [s]
  - Target values:
    - 60 sec for 90%, 120 sec for 100%
    - 30 sec for 95%, 90 sec for 100%
    - 10 sec for 98%, 30 sec for 100%   ?
- USSD receive confirmation failure ratio [%]
  - Target: 1% - 0.5% - 0.1% ?

Short Message Service (SMS)

- SMS service non-accessibility [%]
  - Target: 2% - 1% - 0.5% ?
- SMS completion failure ratio [%]
  - Target: 1% - 0.5% - 0.1% ?
- SMS end-to-end delivery time [s]
  - Target values:
    - 60 sec for 90%, 120 sec for 100%
    - 30 sec for 95%, 90 sec for 100%
    - 10 sec for 98%, 30 sec for 100%   ?
- SMS receive confirmation failure ratio [%]
  - Target: 1% - 0.5% - 0.1% ?

Hypertext Transfer Protocol Secure (HTTPS)

- HTTPS Service non accessibility [%]
  - Target: 2% - 1% - 0.5% ?
- HTTPS set-up time [s]
  - Target values:
    - 30 sec for 90%, 60 sec for 100%
    - 15 sec for 95%, 30 sec for 100%
    - 8 sec for 98%, 20 sec for 100%   ?
- HTTPS session failure ratio [%]
  - Target: 2% - 1% - 0.5% ?
- HTTPS session time [s] *(i.e. page loading time)*
  - Target values:
    - 30 sec for 90%, 60 sec for 100%
    - 15 sec for 95%, 30 sec for 100%
    - 8 sec for 98%, 20 sec for 100%   ?
- HTTPS data transfer cut-off ratio [%]
  - Target: 2% - 1% - 0.5% ?

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Network Provider ≠ DFS Provider

- Provision of a service offer ("service") independent from the physical operation of a telecommunication network
  - In many cases
- For most general service offers ("Apps") there is no specific regulation
  - but, DFS "services" are under the close control of the regulators of the banking sectors
  - and operators of telecommunication networks are under the control of the regulators of the telecom sectors

Need to assess two different legal cases

- **#a**: the provider of a DFS "service" and the operator of a physical telecommunication network are two distinct and different legal entities

- **#b**: the provider of a DFS "service" and the operator of a physical telecommunication network are the same and identical legal entity

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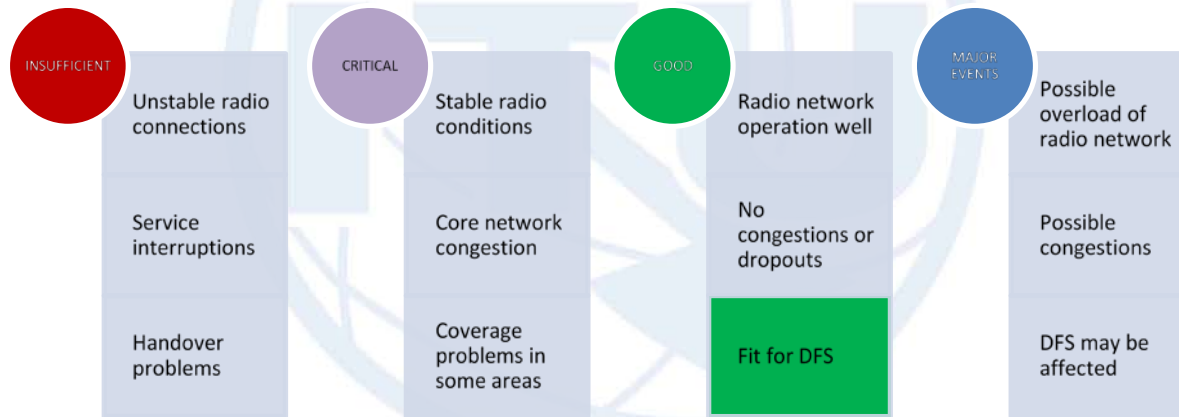- Conclusions & Way Forward

Decision diagrams for DFS Stakeholders

- Successful introduction of DFS requires Fitness of the entire Ecosystem
  - Fitness of the mobile network to provide a minimum level of QoS
  - Fitness of the mobile network to provide the services required
  - Fitness of mobile devices to support the basic services
  - Fitness of the DFS service itself to provide useable interfaces
  - Fitness of users to successfully use DFS
  - Fitness of the general society and the governmental institutions for DFS
- Needs to be agreed upon by stakeholders involved
- No global standardization of Targets possible
- Diagrams provided to enable National or Regional considerations

Example:
Fitness of a mobile network for DFS

INSUFFICIENT
- Unstable radio connections
- Service interruptions
- Handover problems

CRITICAL
- Stable radio conditions
- Core network congestion
- Coverage problems in some areas

GOOD
- Radio network operation well
- No congestions or dropouts
- Fit for DFS

MAJOR EVENTS
- Possible overload of radio network
- Possible congestions
- DFS may be affected

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Basic flow of activities:

Party A decides to transfer amount X from his account to the account of B

- Key interests of this transfers are:
  - Transfer shall be made with a clear indication of success or failure on both sides within a reasonable time span
  - Success rate of a money transfer shall be high
  - Duration of a transaction shall be reasonably short
  - If transaction fails, the situations needs to be completely reverted within a reasonably short time span (i.e. no money "lost in limbo")
  - Transaction shall lead to a stable and correct end state for all participants in a reasonably short time span (i.e. all accounts have to be "up to date" as fast as possible)
  - There must be no losses or duplications of money during the transaction (i.e. money not deducted from A's account but appearing on B's account).

From these requirements, the following end to end KPI can be derived:

- Money Transfer completion rate
- Money Transfer completion time
- Money Transfer False Positive Rate
- Money Transfer False Negative Rate
- Money Transfer Failed Transaction Resolution Rate
- Money Transfer Account Stabilization Success Rate
- Money Transfer Account Stabilization Time
- Money Transfer Loss Rate
- Money Transfer Duplication Rate
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  - NOTE: These KPIs and their technical basis are currently not standardized and therefore cannot be assessed in a comparative manner

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Conclusions

- Good QoE of DFS requires high quality mobile networks
- Problem for many mobile operators:
  - Need to improve entire network
  - No incentive if not their own DFS offer
- Target values need to be set on National or Regional level
- User-centric KQIs for DFS and related QoE assessment yet to be standardized
  - Need to better understand the details of the different DFS applications
  - Standardization is contribution driven !

Study Group 12

- ITU-T SG12 has accepted the challenge to accommodate the QoS/QoE related needs of the DFS community
- Participation in ITU-T SG12 is solicited
- Contributions to Study Group 12 are encouraged
  - In general (of course)
  - Regarding DFS QoS and QoE (in particular)
- ITU work is contribution driven
  - Please show up and contribute and make it happen !
- Next meeting:Geneva, 19 – 28 September 2017

Way Forward

- Financial Inclusion Global Initiative (FIGI) Symposium
  - http://www.itu.int/en/ITU-T/extcoop/figisymposium/Pages/default.aspx
    - Security Infrastructure and Trust Working Group (SIT WG)
      - https://extranet.itu.int/sites/itu-t/initiatives/sitwg/SitePages/Home.aspx
        - Quality of Service (QoS) Workstream
          - https://extranet.itu.int/sites/itu-t/initiatives/sitwg/qos/SitePages/Home.aspx

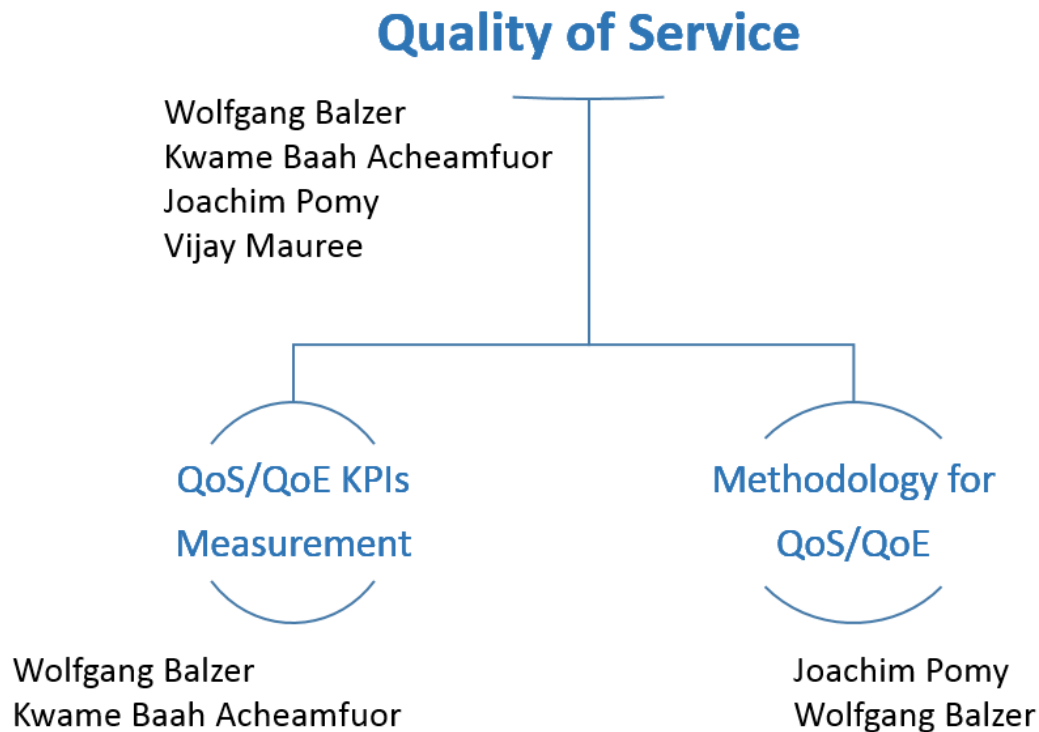Contact: Vijay Mauree vijay.mauree@itu.int

Quality of Service (QoS) Workstream

- Main objectives:
  - provide a solid information base for insights into the relation between network and service performance
  - undertake field tests for end-to-end quality metrics assessment for DFS and develop related methodologies
  - develop a methodology and toolkit for telecom regulators for the measurement of key performance indicators (KPIs) for QoS and QoE for DFS
  -

Co-Leads and Responsibilities

Quality of Service

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QoS/QoE KPIs Measurement

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Methodology for QoS/QoE

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Any questions **?**

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Report on:
QoS and QoE Aspects of Digital Financial Services
http://www.itu.int/en/ITU-T/focusgroups/dfs/Documents/09_2016/FGDFSQoSReport.pdf