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FIGI Symposium

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#financialinclusion

FIGI FINANCIAL INCLUSION GLOBAL INITIATIVE

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QoS Workstream: Capacity Building
QoS for Digital Financial Services

Goals

- The goals of this Capacity Building session are to provide:
  - general understanding and practical knowledge on test case modelling
  - identify and select end to end parameters for simulations.
- Target audience: Telecom Regulators, Financial Sector regulators, operators of Digital Financial Services
- No previous experience or background knowledge on QoS is needed.
- The session will contain a “hands-on” Team Exercise on creating meaningful use case definitions, metrics and test campaign designs.
- Participants work in teams of 3-4 persons using an actual video of a DFS use case, getting support during the exercise. They will then be able to present their results and get further professional feedback.

Overview

- This session will
  - Introduce the concepts behind QoS and QoE metrics
  - Explain how test campaigns are designed in order to produce high-quality results
  - Deliver practical knowledge on use case modelling and planning of test campaigns

QoS KPI Basics

- A well-designed set of QoS KPI expresses the business value of a service
  - QoS KPI express quality as perceived from an end customer's perspective
  - Optimizing service properties having no effect on customer satisfaction would be a waste of resources
  - If a service has properties which are not monitored by respective metrics, these properties are out of control from a QM point of view
- Properly designed metrics are a tool to optimize resource allocation

QoS vs. QoE

- QoE – Rec. ITU-T P.10/G.100
  - 6.209 quality of experience (QoE)
  - The degree of delight or annoyance of the user of an application or service. [b-Qualinet2013]
  - NOTE – Recognizing on-going research on this topic, this is a working definition which is expected to evolve for some time. (This note is not part of the definition.)
  - Source: https://www.itu.int/ITU-T/recommendations/rec.aspx?id=13408&lang=en

- QoS Rec. Rec. ITU-T G.1000
  - 3.2 quality of service (QoS): the collective effect of service performances, which determine the degree of satisfaction of a user of the service (ITU-T Rec. E.800).
  - Source: https://www.itu.int/ITU-T/recommendations/rec.aspx?id=5597&lang=en

QoS and QoE contd.

- QoE – Rec. ITU-T P.10/G.100
  - 6.210 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.
  - 6.211 QoE assessment
    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.

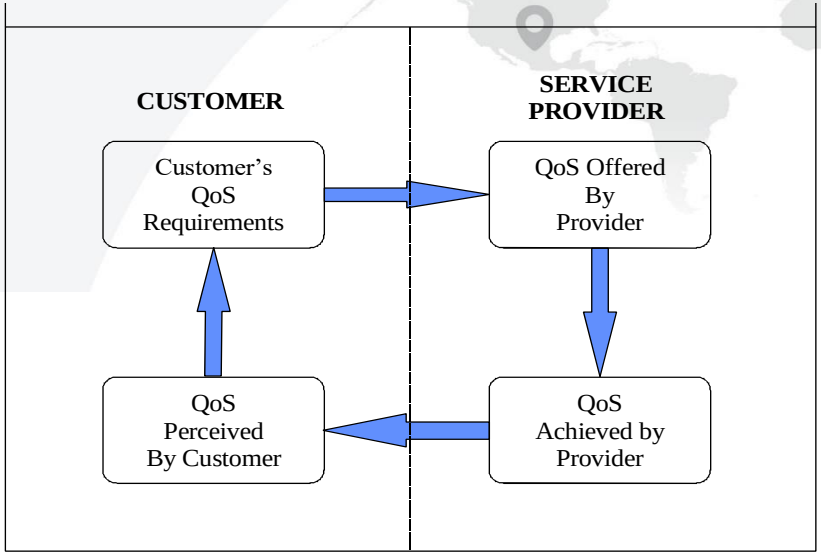
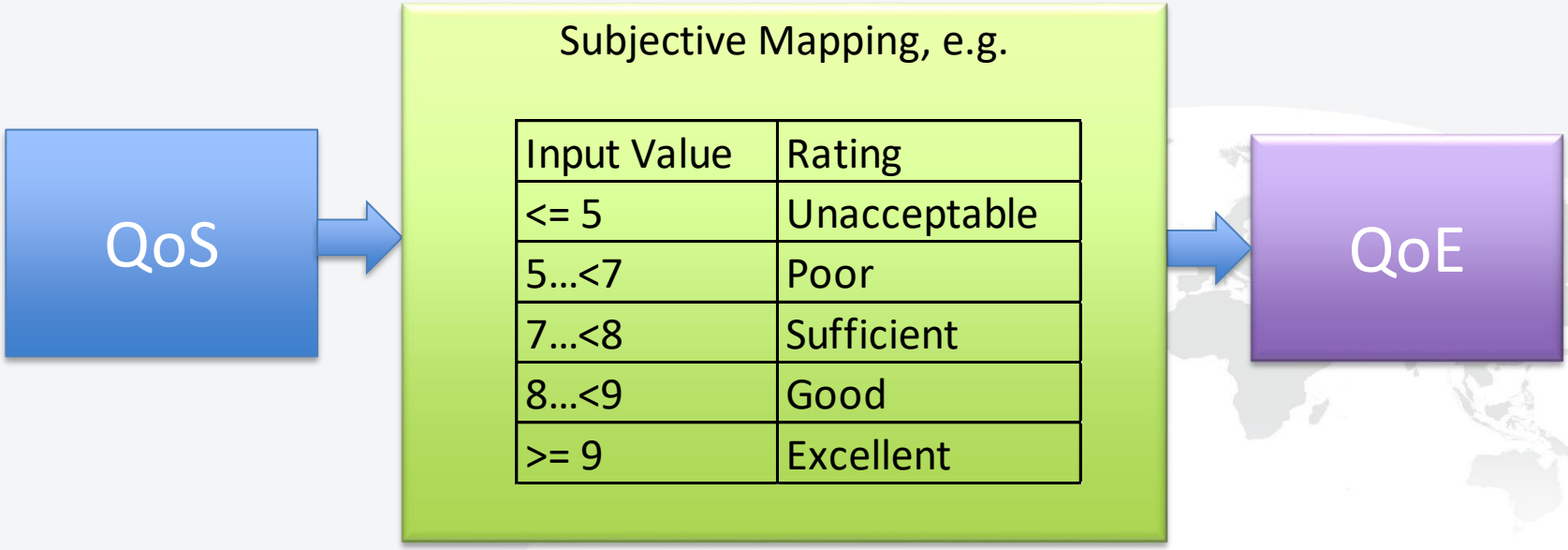


Figure 2/G.1000 – The four viewpoints of QoS

Practical definition of QoS vs QoE



- QoE can be determined from QoS by applying a mapping which contains elements from the opinion, experience, or expectation domain.

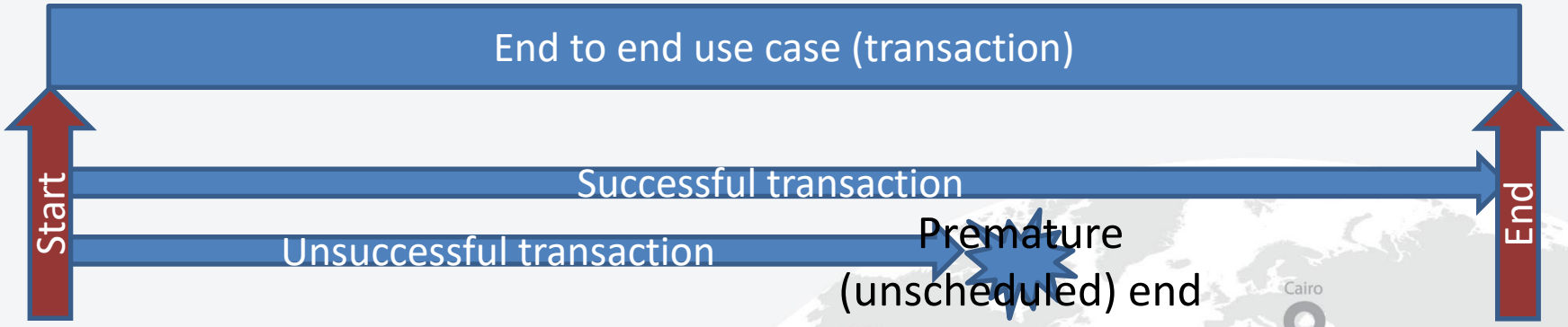
QoS/QoE KPI should be simple

- Typically, end to end customer perspective can be expressed in simple terms
  - The “Philadelphia test”: It should be possible to explain the concept to a five-year old
  - Use a small number of powerful KPI
  - If there are too many KPI, the picture they paint can easily be confusing and contradictory (every service provider is “test winner” in some category)
    - Example: If the “call drop rate“ (CDR) for telephony is calculated from only those calls which have been successfully established, a network with poor coverage (only a few calls established at all) may be the test winner in the CDR category

Modelling

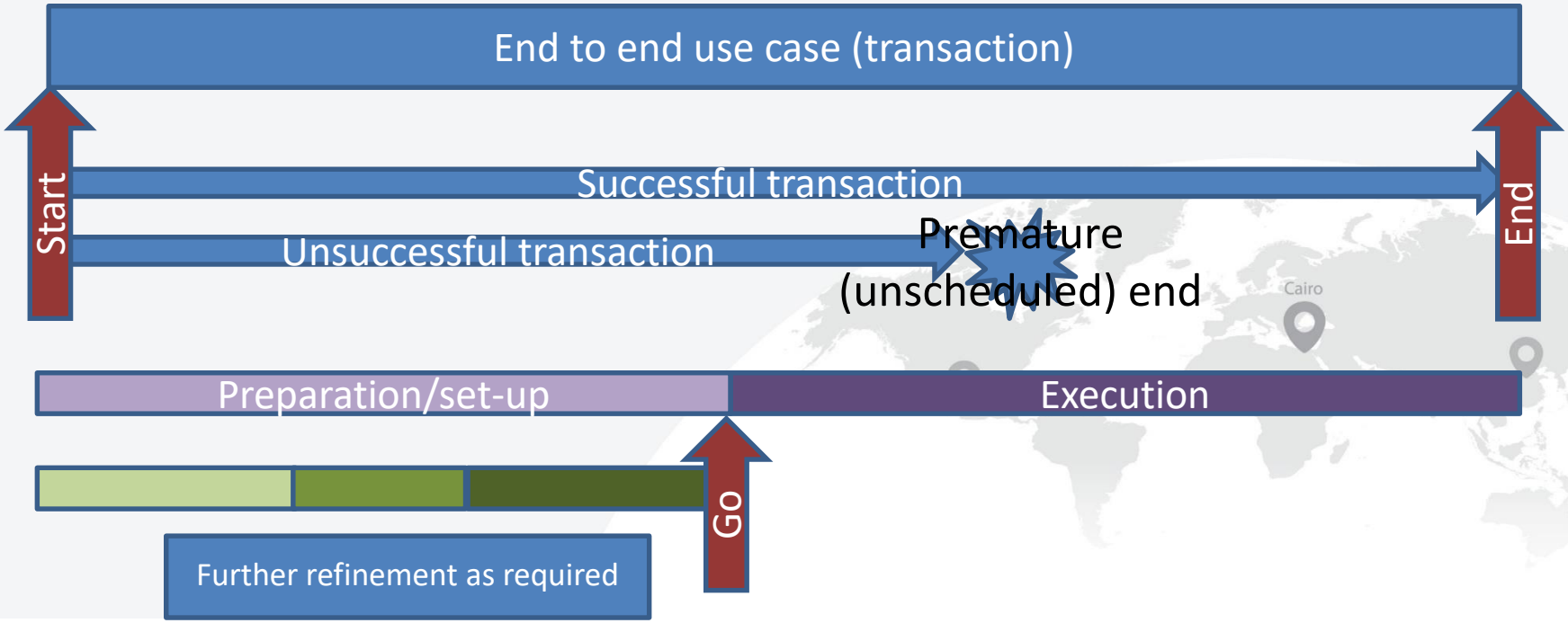
- Take a typical service usage (“transaction”)
- Find the events which can describe this transaction (visible from the customer’s point of view)
  - Simplest case: Start and end
  - Telephony case:
    Dial->wait for connection->do the call ->hang up
  - Mobile Money: Start the service application->enter required information->Execute->wait for the system’s acknowledgement of the result
- Step-wise refinement when necessary (Sub-dividing the flow into phases, with respective events (“trigger points”)
- Assign KPI to phases

Use cases, transactions, phases



- Top-level “end-to-end” view
- Events are meaningful, observable entities (points in time). Dual use:
  - Progress markers. Success = “End” event observed
  - Timers. Execution time = time of “End” minus time of “Start”

Use cases, transactions, phases

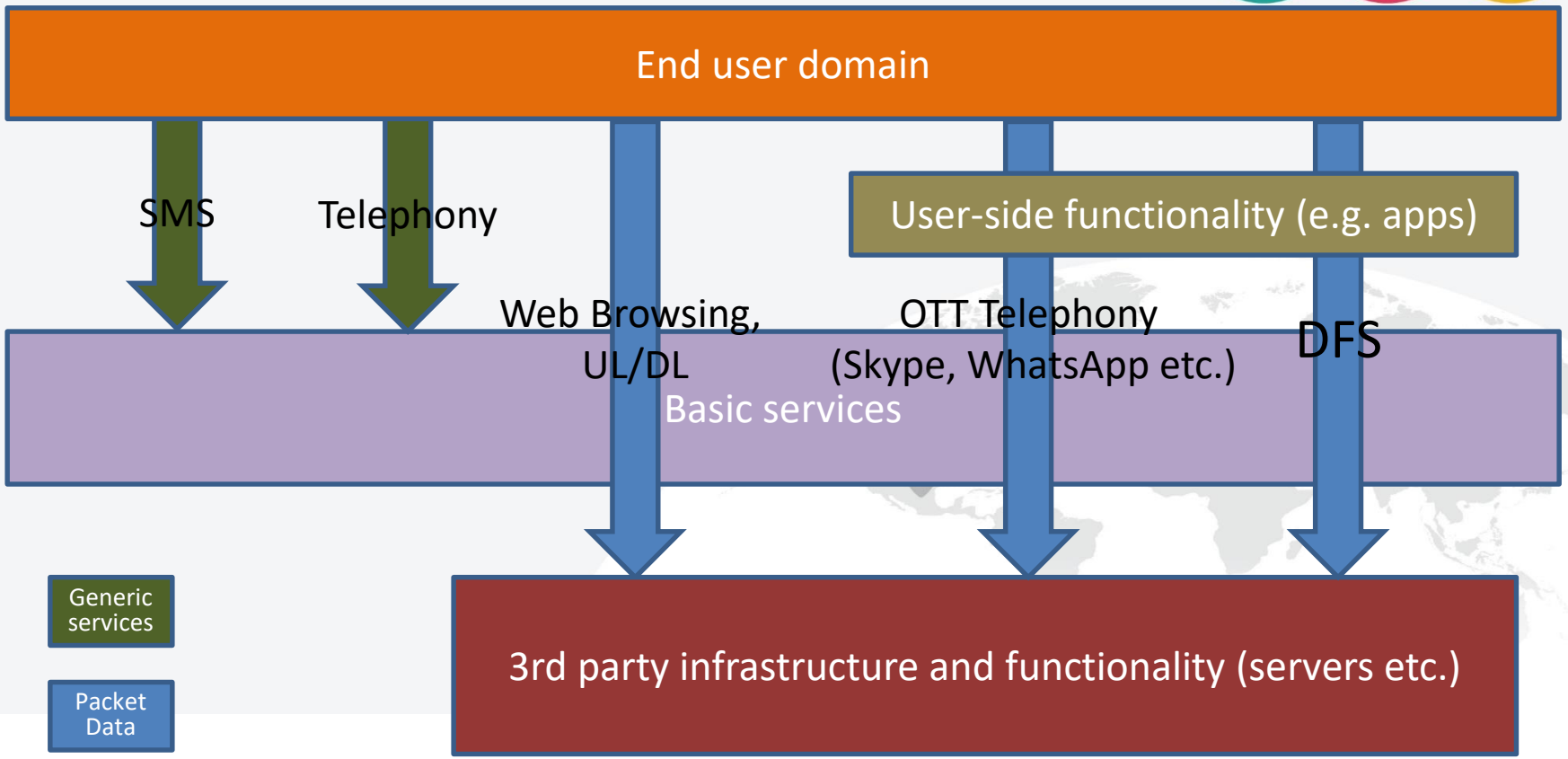


- Phases: adding detail, top-down principle
- (e.g. set-up, usage); allow for differentiation of KPI
- “Seamlessness” principle: completion of phase A is start of phase B

Use case and KPI modelling – what to observe

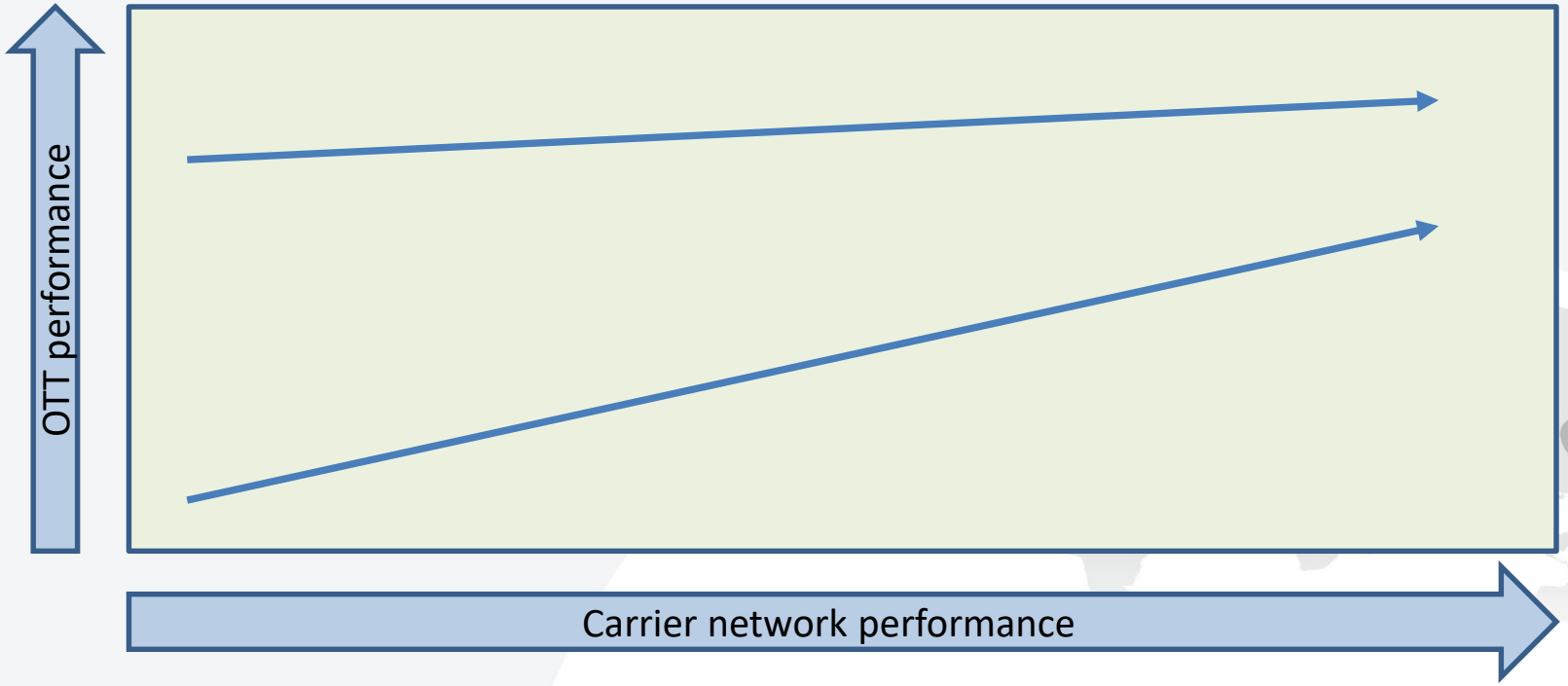
- Assume the service is a “black box“: Design generic models
  - Using knowledge about the inner working of the service is tempting (more information or easier testing) but can be dangerous (creating wrong results) if implementation details change
- Use “positive” success criteria
  - Find a clear definition of a successful transaction. When using negative definitions, there is the risk of blind spots and artefacts (paths leading to non-success which have not been thought of before)

Services and performance



- A mobile network offers some generic services (e.g. telephony, SMS, basic packet data services). “Over the top” offerings utilize these services as carrier services.

Effect of carrier service performance on end to end performance



- Basic vs. Implementation specific dependencies
  - Basic: Network availability/network accessibility; general carrier service performance
  - Implementation specific, e.g. stronger dependence if OTT service is “bandwidth hungry”

Design of Test Campaigns

- Transparency
  - Clearly define what is measured
  - Limit uncontrollable environmental effects as much as possible
  - Validate test methods/use cases and data processing
- Repeatability
  - Test question: Which information is needed to repeat the test?
    - Have an understanding of which outer effects affect results, e.g. platform (computer/mobile device)
  - If the system under test is the same, the test must produce the same result (within statistical accuracy) when repeated
  - Keep records, logs etc.
- Data Quality: Make sure data is meaningful
  - Minimize the effects of human error
  - Use automation and tool-assisted testing wherever it makes sense
  - Make sure relevant data is measured in a well-defined way
    - E.g. time-taking should always use the same tool and way of reading the values
- Robustness: Protect against loss of data
  - Make sure that measured data is preserved (e.g. back-ups, intermediate upload); use four-eye principle where reasonable feasible

Field testing - Basics

- Field time is precious – avoid idle times or unclear conditions
- Use a careful “mental walk-through” for the execution of tests; take nothing for granted
  - Is there enough battery level on the mobile devices to run the test?
  - Can batteries be recharged (wall plugs, chargers, power banks…)
  - Is there enough credit on the SIMs?
  - Special questions for MoMo service tests:
    - What happens if money “disappears” from the loop? (sufficient reserve, an action plan for that case)
    - Shall tests be made in “mystery shopping” mode? What happens if some security system becomes aware of atypical patterns (e.g. unusually frequent money transfers between the same accounts)

Statistics

- Tests produce a limited number of data points (samples)
- The accuracy of indicators is a function of sample count
  - Example: When a success rate is calculated from 100 measurements, the result has a statistical uncertainty of ~ +/- 3%
- For further reading: ITU-T Rec. E.840 or ETSI TS 102 250-6 on statistics; ITU-T Rec. E.804 generally on QoS/QoE

Exercise

- Use the video provided and create a model of the MoMo use case
- Define the events used for KPI calculation
- Design a data acquisition form and a “check list” for test preparation and monitoring of test activities

Team Exercise Mode of Work

- Work in teams of 3-4 persons
- Time given to complete the tasks: approx. 20 minutes
  - Questions can be asked during the task (first come first serve basis)
- Each team presents its results and questions (5-10 minutes per team)
- **Times shown above will be adjusted to the size of the group**

Thank you for your attention.
Questions?

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