Use-case Certification Process

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Abstract

Certification is the process of monitoring the operation of a system against a set of functions that are usually specified by one or several standardisation bodies in a number of technical specification documents.

Concerning communication networks, a system is usually a network device, e.g. a gateway, a user terminal, an equipment used for network testing or even a network procedure, e.g. mobility management.

The present document explains the certification process as a potential use-case to be adopted by the PII platform by highlighting implementation and usability issues as well as projected benefits for the PII platform out of its support.

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1   Executive summary

(Provide an outline description of the use-case, maximum half page)

Certification is defined as the process of monitoring the operation of a system against a set of functions that are usually specified by one or several standardisation bodies in a number of technical specification documents.

Concerning communication networks, a system is usually a network device, e.g. a gateway, a user terminal, an equipment used for network testing or even a network procedure, e.g. mobility management.

Certification is an important procedure through which a number of vital aspects concerning integration of the system under test within networks can be monitored and quantified. Such aspects include:

- Interoperability of networks: A system is controlled against compliance to a minimum set of functions, which if satisfied guarantee a certain level of interoperability of the system with neighbouring components in the network. To facilitate interoperability experiments several standardisation bodies, such as Satlabs for satellite networks or 3GPP for mobile networks have specified a number of testing cases which if passed by the system under test can guarantee a minimum level of interoperability in the network.

- Compliance to standards: A system is certified against support of a set of standards, usually expressed as protocols or protocol stacks. As new procedures are added to networks, new versions of protocols/protocol stacks are specified. Certification is therefore important for testing system's compliance to the new protocol features.

- Compliance to network procedures: The advent of mobile and wireless networks has created the need for approving networks and individual network components against support of procedures such as roaming, handover, mobility management, support of location based services. As in the previous cases, certification is applied as a set of test suites, which can be executed in order to categorise the system in several compliance levels with regard to the procedure under test.

- Compliance to a number of performance issues: Performance of networks or systems is defined as the capability of the network/system to sustain normal operation under certain stressful traffic conditions. For example, the network may sustain without losses a number of users, exploiting in parallel communication services or applications.

Certification is important for guaranteeing a quality of networks and services. Especially judging from the heterogeneity of Next Generation Networks technology concerning physical communication interfaces, protocols and services, certification is an issue of vital importance that guarantees networks and services interoperability.

It is therefore anticipated that certification process of the PII federation will be useful not only for operators and network manufacturers but mainly for SMEs, which cannot afford setting up experimental testbeds to host certification experiments.

Examples of systems requiring certification are:

- Test equipments implementing a number of testing capabilities, such as traffic monitoring, simulation, emulation or even load test need to be certificated prior to be launched on the market.

- Network installations developed by the industry need certification against the number of parallel users they support, interoperability of protocols and procedures with external networks and capability in hosting certain services.

- Manufacturers of network components are interested in testing the performance of the systems they produce as well as to guarantee a certain level of interoperability.

2   Targeted users

(In this section please provide information about the actors and stakeholders)

- List of primary actors[1]:

SMEs: Test equipment manufacturers, network component manufacturers, services/application developers.

Industry: Network components manufacturers, network installations providers.

- List of supporting actors[2]:

    Industry: Network site developers having interest in components that must be certified in terms of performance and protocol support.

- A list of stakeholders and their interests[3]:

    Operators and third party service providers.

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[1]   *List the Actor who's goal is being satisfied by this Use Case and has the primary interest in the outcome of this Use Case.*

[2]   *List the Actors who have a supporting role in helping the Primary Actor achieve his or her goal.*

[3]   *A list of the various entities who may not directly interact with the system but they may have an interest in the outcome of the use case. Identifying stakeholders and interests often helps in discovering hidden requirements which are not readily apparent or mentioned directly by the users during discussions.*

3 Description

Give a detailed description of the use-case taking into account the aspects indicated by the sub-sections below. Feel free to introduce additional sections in case there are additional aspects to be highlighted.

3.1 Interfacing with the user

Please provide information at least on the following:

- **Goal** – The use-case is crucial for actors involved in rolling-out new communication technologies on the market. To bring these actors together, nowadays important standardisation bodies, such as, 3GPP, NFC, Satlabs, etc, are organising Plug Fests were interested manufacturers have the opportunity of testing several aspects of their systems such as interoperability and compliance with the new standards. The objective behind these Plug Fests is to allow new technologies deployed experimentally to mature so that to meet the stability and usability requirements of the market. By accommodating this use-case, PII gains important focus concerning its future technological orientation and a good source of revenues as a potential incubator of Plug Fests.

- **Actors** – Primary actors are manufacturers/service providers of new technologies. Supporting actors are SMEs or universities/research institutes that carry out part of testing and technology development on behalf of the primary actors.

3.2 Platform set up

Please provide information at least on the following:

- **Pre-conditions or assumptions[4]** –
    1. **Pre-condition #1**: a network infrastructure must be available. Depending on the component under test, e.g. service or a set of communication components, the infrastructure may vary from something simple, such as availability of access to the Internet, to something much more sophisticated, such as a particular network technology, e.g. a 3G hot spot.
    2. **Assumption #1**: Availability of test suits to be used for performing the use-case. These may be communicated to the Pan-European Laboratory office by the interested actors or may be already available from past experiments.
    3. **Assumption #2**: Availability of network configuration data for the implementation of the communication scenarios demanded by each certification process. For example, interoperability testing of new technology wireless hot spots, such as 4G hot spots, may require implementation of various communication scenarios for testing aspects of handover performance, communication rates, radio coverage, etc, each one requesting special network configurations.
- **Trigger[5]** – The use-case may start when the pre-conditions and assumptions expressed above are satisfied.
- **Steps** –

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[4]   *Conditions that must be true for the use case to terminate successfully. Each assumption should be stated in a declarative manner, as a statement that evaluates to true or false. If an assumption is false then it is unspecified what the use case will do. The fewer assumptions that a use case has then the more robust it is.*

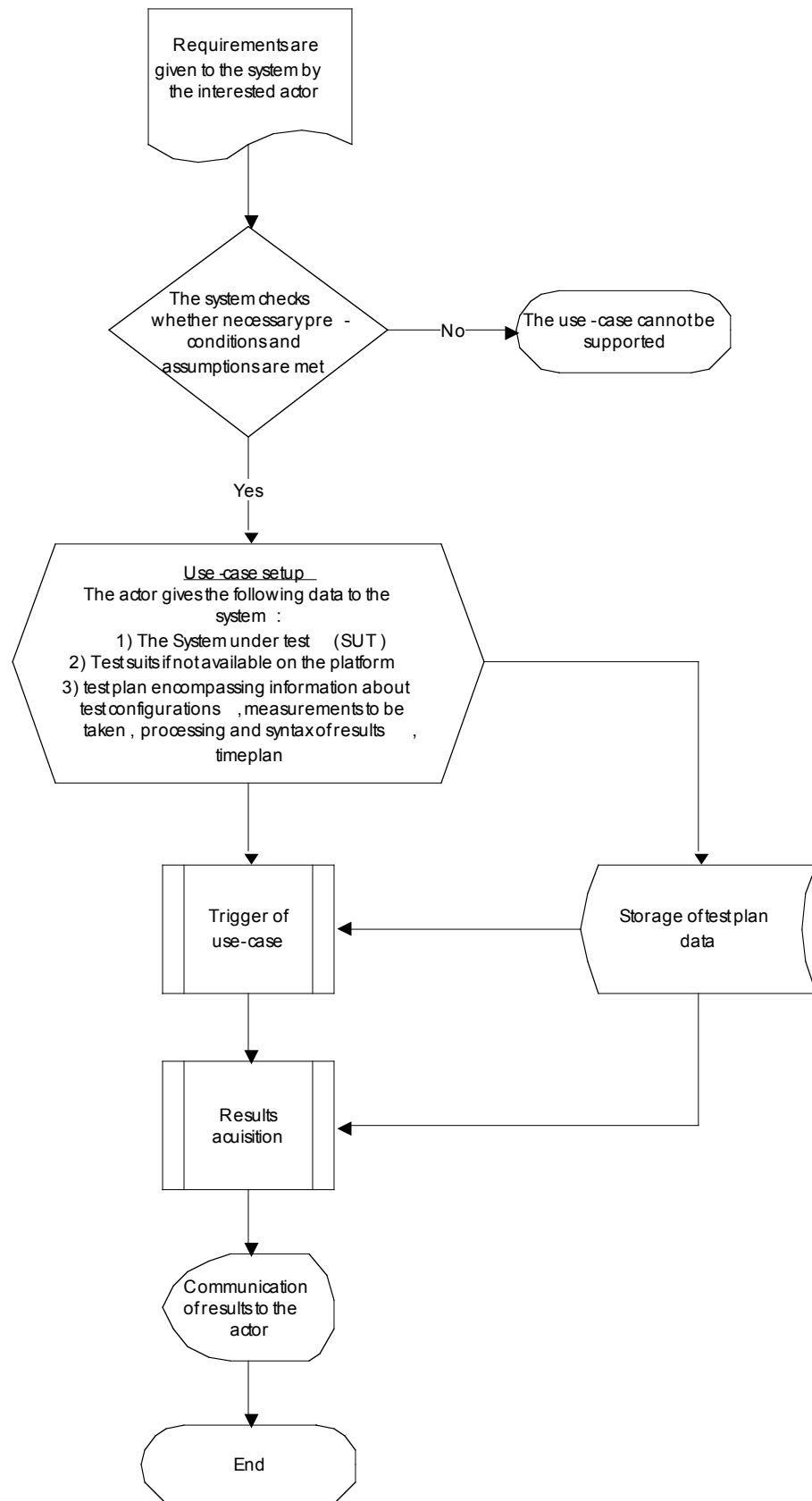[5]   *The event that starts this use case*

Figure 1: Platform setup

- **Non-functional requirements** – Such requirements may vary significantly depending on the nature of the experiment. Generally speaking, the time plan of the use-case should be respected

and the infrastructure offered by the PII should meet the performance requirements of the use-case.

3.3 Results acquisition

Acquisition of results should happen during conduction of the use-case. In general the following conditions may influence the course of use-case implementation:

- **Post-conditions** – All test suits agreed between the actor and the system should be implemented on the platform successfully.
    - **Success end condition** – All planned test configurations and traffic scenarios have been executed successfully independently of whether the obtained results showed compliance of the system under test or not to the target certification requirements.
    - **Failure end condition** – At least one mandatory test configuration fails repetitively.
    - **Minimal Guarantee** – The platform should ensure confidentiality of results concerning the compliance of the system under test to the certification requirements. This minimal guarantee should be provided by the system so that competition between actors in a given area is not affected.

3.4 Charging

The charging model may be similar to that applied to Plug Fests organised by standardisation bodies or may be implemented in the form of single fee that is paid on the basis of each individual experiment.

In the first case charging can be applied as a subscription fee that is paid on annual basis and allows the actor to organise a certain number of Plug Fests.

In the second case the fee can be paid on the basis of each individual Plug Fest that is carried out occasionally and may be calculated as the sum of the cost for the utilisation of the system plus any extra component that may be needed.

4 Expected impact

4.1 Research on the Future Internet

Certification is an important procedure through which a number of vital aspects concerning integration of the system under test within networks can be monitored and quantified. Quantification can be made in terms of performance as well as in terms of compliance to protocol/service specifications.

The latter option is very useful to actors working on new network technologies because new services/protocols implemented experimentally on prototype network components and platforms can be tested against initial functional and non-functional requirements.

In addition to the latter possibility, the use-case is particularly useful for facilitating transition of new technologies from experimental to commercial form and therefore offers the potential of reinforcing competitiveness of the European industry through the faster take up of new technologies on the market.

4.2 The market

As has been noted earlier, the certification use-case is suitable for testing functionality of systems covering the whole value chain of the network technology, including but not limited to:

- Network platforms; e.g. converged communication platforms, such as IMS networks.
- New Internet protocols: e.g. Web 2.0 and Web 3.0, advanced streaming protocols for multimedia applications.
- Network components: e.g. QoS enabled Border Gateways Functions (BGF) for IMS networks, such as PDF and RACS, RACS systems, etc.
- Supplementary systems: e.g. test equipment, such as traffic generators, analysers and protocol monitoring tools.

4.3 Evolution of an independent entity

By accommodating the use-case on its platform the Pan-European Laboratory secures a continuous flow of revenues coming from large manufacturers, SMEs and operators, wishing to test compliance of their systems. On the other hand, the Pan-European Laboratory manages to secure future technological orientation of its platform by keeping track of the industrial demand and ongoing tendencies concerning networks evolution.