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Use case overview

# Introduction

This draft is describing a set of use cases for the broadband measurements applied to mobile domain.

Some of these use cases make sense even for the fixed network, not only for the mobile, and the specification related to these scenarios are present in IETF draft-ietf-lmap-use-cases-06 document.

The stakeholders involved in the use cases related to the mobile domain are summarized in the table below while the use cases overview is described in the next sections.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Stakeholder** | | | | | | | | |
| **Measurement application** | **Governmental policy maker** | **User (individual or enterprise)** | **Cell tower operator** | **Wireless carrier / Network operator** | **Researcher** | **Standards developer** | **User device vendor** | **Application developer** | **Mobile Application Service Provider** |
| Overall data on Quality of Experience of set of networks available to consumers | x | x | x | x | x |  | x | x | x |
| Quality of Experience of a specific network |  | x | x | x | x |  | x | x | x |
| Identify limitations in deployment of a specific network |  | x | x | x |  |  |  | x |  |
| Monitor for changes in operation of a specific network |  | x |  | x |  |  |  |  |  |
| Diagnose problems in a specific network |  |  | x | x |  |  |  |  |  |
| improve knowledge of system performance |  |  |  | x | x |  |  |  | x |
| lead the market toward more effective networks | x |  |  |  |  |  |  |  | x |
| encourage the redeployment of scarce spectrum using efficient technologies and implementations | x |  | x | x |  |  |  |  |  |
| compare measured performance data to simulated results |  |  |  |  | x | x |  |  |  |
| assess theoretical models |  |  |  |  | x | x |  |  |  |
| assess technology elements proposed during standards development |  |  |  |  |  | x |  |  |  |

Table 1: Assessment of key measurement applications per stakeholder role

# Wireless carrier/network operator mobility use case

As usual in mobile domain, it is necessary to characterize the mobile broadband services even during mobility events.

Such characterization can be correlated to specific cells and/or specific services.

The adoption of measurements at end user premises can be reused even for setting proper values for handover settings.

This scenario is useful for the so called SON networks, where the network is automatically setting its configuration values. The availability of end user measurements related to mobility can be used to check the correctness of SON methodology.

# Wireless carrier/network operator QoS for SLA checking

The end user perspective can be used to characterize the Quality of Service (QoS) experienced by the UE. The term QoS is used here to mean the comprehensive set of measurements that typically make a SLA (Service Level Agreement) contract.

Such QoS measurements can be used exactly to check SLA levels. In the use case definition, it has to be considered the impact of UE device performances on the SLA figures, in order to assign to the network the proper responsibilities.

# Wireless carrier/network operator QoS for resource allocation

QoS measurements are useful also to manage the radio allocation and parameter configuration in order to feed optimization systems as in the Self-Organizing Networks. This is typically done at network level but the availability of the UE perspective can help especially for network technologies that don’t provide a complete reporting of the UE measurements.

For example, spectrum allocation and configuration parameters can be modified according to the measurements provided by UEs, for example to avoid network overload and congestion and minimizing the radio contact lost with UE.

# Wireless carrier/network operator troubleshooting

The end user measurements can be used even to troubleshoot the network, for example triggering signaling radio protocol measurements with protocol analyzers or call trace equipment typically adopted by NOs.

# Wireless carrier/network operator: characterization of new release introduction

Measurements provided by end-user can be used to characterize the performance after network equipment release changes.

Aggregated per cell and radio technology, it is possible providing KPIs that can be used to compare the network performances before and after new release changes at access network level, with the end user perspective.

# Standards developer

The end user measurements are useful to understand the impact of standards on actual mobile performances.

For example they allow to compare expected results with current results, in order to validate technical choices. An example could be the adoption of specific codec for voice or the adoption of specific protocols for data services.

Another example is the impact of security on UE performances, because authentication and ciphering techniques could affect overall performances.

# User device manufacturer

User device manufacturers can be interested in the adoption of UE broadband measurements to characterize the inter-operability of the device with real networks.

The adoption of KPIs divided per user device is helpful in this type of characterization.

The interaction of the specific device on different mobile networks is also interesting, because there can be potentially network settings that interact differently with the mobile.

# NE manufacturers

The same end user measurements can be useful even for NE manufacturers that can compare access network results managed by competitors and check the results against their own results.

This is helpful in positioning NE performances against the competition.

# Mobile application developers

In case of mobile applications, it is important to characterize how well the app is performing through the network.

This can be useful for two purposes: ask for better network level of service to NOs and also check how the app is performing across the real network.

This characterization can be also the trigger to app changes that minimize the drawbacks with the network interaction.

It is possible for mobile application developers also to include monitoring callbacks that can be useful for passive measurements.

# Mobile application service providers

Mobile application service providers are interested in mobile broadband measurement characterization. Obviously this makes sense provided that it is possible correlating the measurements to the specific invoked application.

From one side it is possible measuring the volume of mobile application transactions, as typically available in the market, but also it is possible correlating such usage with the actual performance level.

A consequence of such analysis could be marketing initiatives to sponsor specific radio technologies, more performing, with some critical mobile app.

In case of networks that don’t support the bandwidth needed for a specific application, it is needed to trigger modifications either in the application itself or in the network. The trade-off decision can be driven even by end user measurements.

# Cell tower operator

The possibility to perform, collect and manage end user measurements on its own is important even for Cell tower operator, that can characterize the coverage provided by the cells without the need of expensive measurement equipment.

# Governmental policy maker

The ability to get measurements from end users is a key factor for governmental policy makers to have a view of network capabilities, for example to enforce the migration to mobile technologies more performant or to require the network enhancements on geographical areas that are important for several reasons, e.g. social or political reasons.