umlaut

# 2022 Fixed Broadband Benchmarking Framework – proposed updates.

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# umlaut Fixed Benchmarking Framework 2022 – main updates
summary of main changes and rationale.

## KPI Updates

**Active Speed Testing:** adding UL background speed test: an additional, much–requested layer to passive crowd data collection. Active DL and UL speed statistics cleansed from "failed" speed tests (see stability).

**Passive Speed Testing:** removal of less demanding categories (basic internet), addition of UHD category for UL

**Latency:** removal of less demanding category (OTT voice), addition of Ultra Low Latency category, shedding light on fiber deployment.

**Stability:** Transaction Success KPI based on a range of active use cases in the crowd (speedtest, webpages, connectivity), contributing to "most reliable" scope

## Algorithm Updates

**Line detection:** based on Gateway MAC address – improving the detection of multiple APs or repeaters connected to the same line

**Cleansing Wireless backhaul:** improved elimination of mobile hotspots and fixed wireless

## Scoring Updates

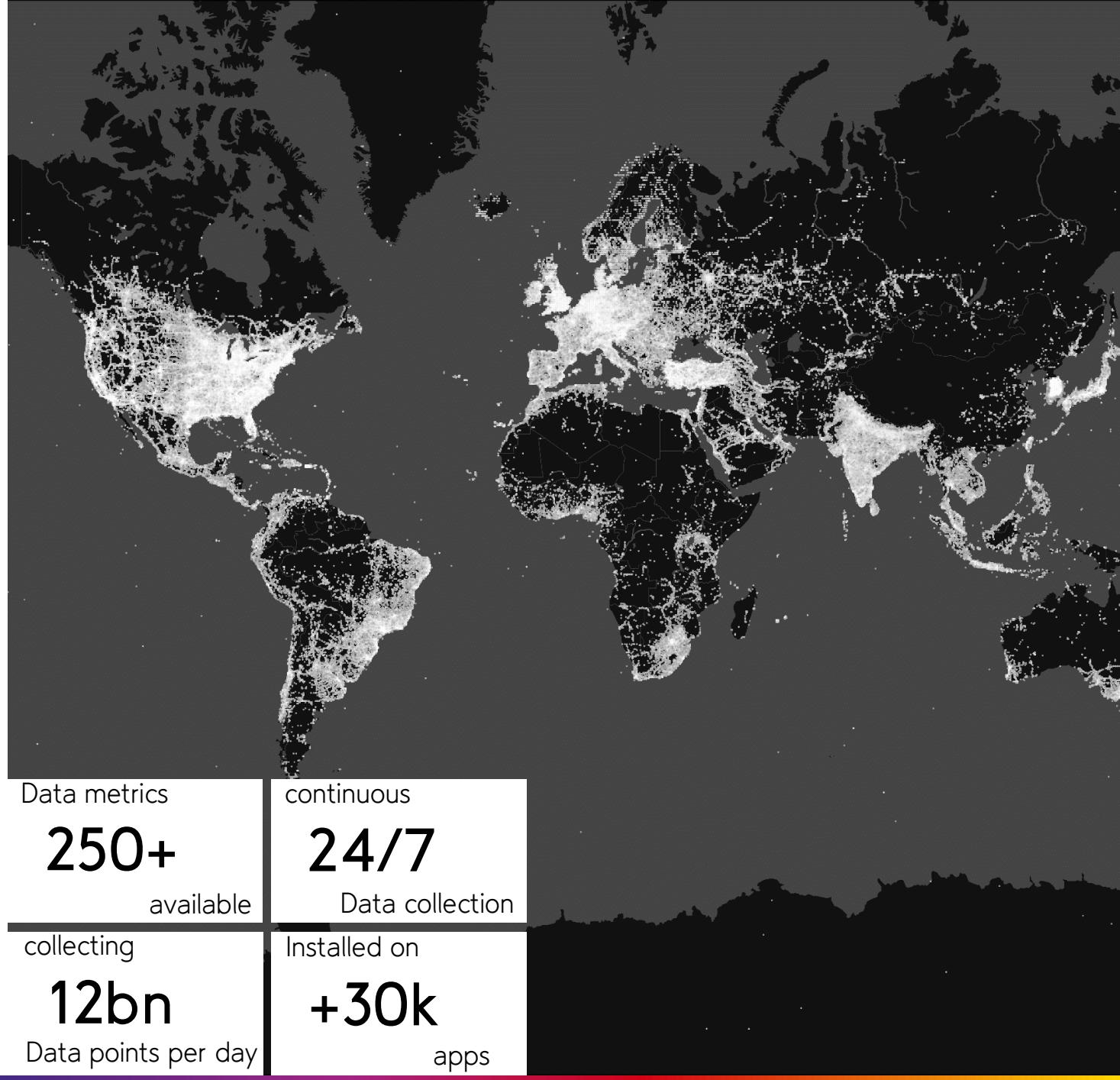
**Weights:** Rebalance to take up new KPIs – accommodate for addition of stability, UL speed test

**KPI Targets:** General review of KPI Target settings in view of global data distribution and fixed line user requirements

**Introducing Reliability Scope:** harmonized with approach in Mobile Crowd Score, report on baseline achievement

# umlaut Crowdsourcing
# Global footprint.

- Active and Passive data collection directly on end–user smartphone devices,
- Global footprint with common big data analytics approach applied worldwide
- Observing passively activities on the smartphone, collecting 250+ KPIs
- umlaut SDK is integrated in 30000+ applications worldwide
- Footprint reached is typically around one in any 1,000 inhabitants



# **Benchmarking, our Territory.**
# The Industry Standard.

Our top priority is to fairly and transparently assess the global development of networks, push their quality and performance with our benchmarks and ultimately achieve improvements for every customer.

We can apply our unique scoring methodology to fixed line ISPs globally.

This year's methodology introduces active testing components to the set of evaluation criteria to complement the user centric passive observation of internet speeds with an ISP centric view.

# Preface.
## The umlaut Benchmarking Framework Basis.

The umlaut Benchmarking Framework is based on a unified measurement method for true international comparability combined with the umlaut–Score approach.

**Key features:**

- International comparability
- End customer relevance
- Drill–down capability
- Transparency

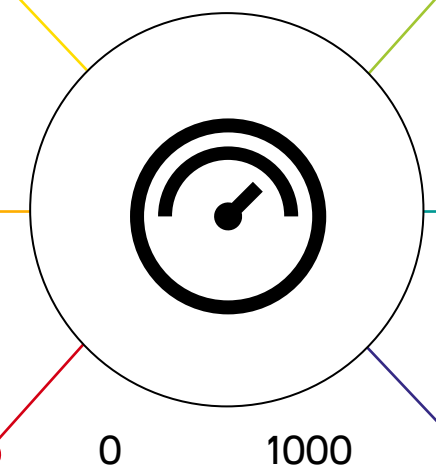
# Rationale
## How to stay focused?

Measuring performance means collecting a vast multitude of different performance indicators, so the important aspects can be easily missed. The question is how to stay focused and communicate results smoothly?

The umlaut Score, as a management tool, is umlaut's solution which:

- aggregates the complete set of KPIs into a single score figure, preserving the drilldown capability
- features implicit weighting of environment, services and KPIs and comparability on national and international level ...

# umlaut Score
## As a Management Tool.




**Unique performance profile**

That characterizes your network

**Benchmark**

Your network against competitors in or across markets

**Priorities**

Help steering your investments where they make an impact to the user

**History**

Benchmark against your former self

**Manageable targets**

Derive achievable targets to steer your teams

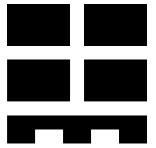
**Learning from best in class**

Understand what can be achieved with similar setup/spectrum/vendor

# **umlaut Score Principles.**
# Building Blocks.

The umlaut score delivers a robust scale to assess network quality and performance. It is coupled with a unified measurement methodology for true international comparability.

Modular Score Approach



Unified Measurement Methodology

Modular Score Approach

# Concept Overview

## Characterized by

- Defined weighting between performance aspects
  - Download speeds
  - Upload speeds
  - Round Trip Time Latency
  - Stability
- Relation of observed performance to typical end–user services
- Fixed maximum score

## Properties

The **umlaut Fixed Broadband Score** covers a crowd–sourcing based assessment of ISPs obtained through the observation of end user performance on handsets connected to fixed line ISPs via WiFi.

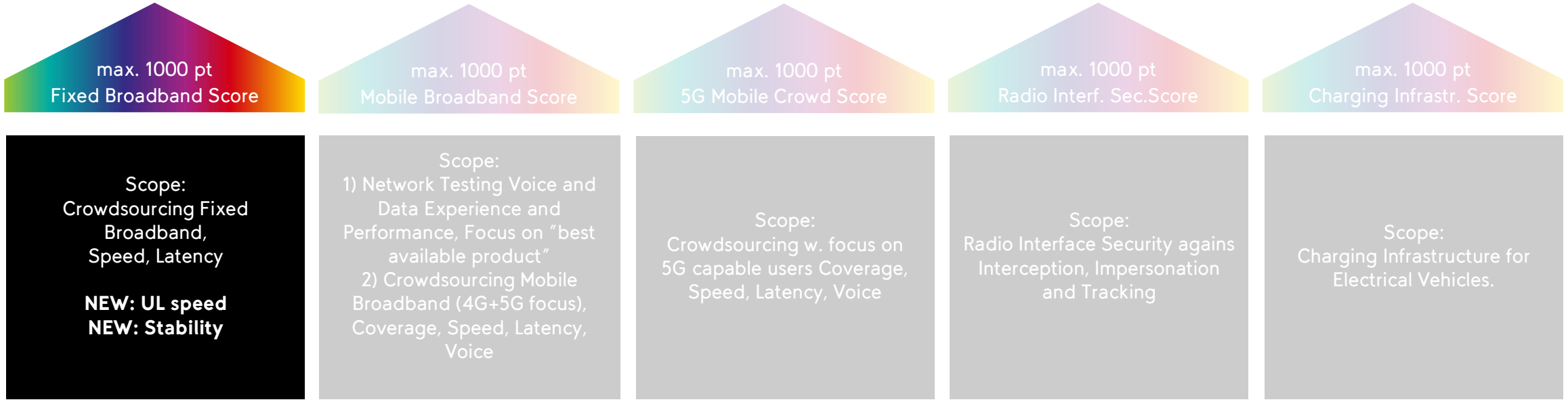
The score works based on the identification of individual subscriber lines and their speed capabilities.

It also provides means to take into account the different geographical distribution of data from different ISPs to ensure a fair comparison.

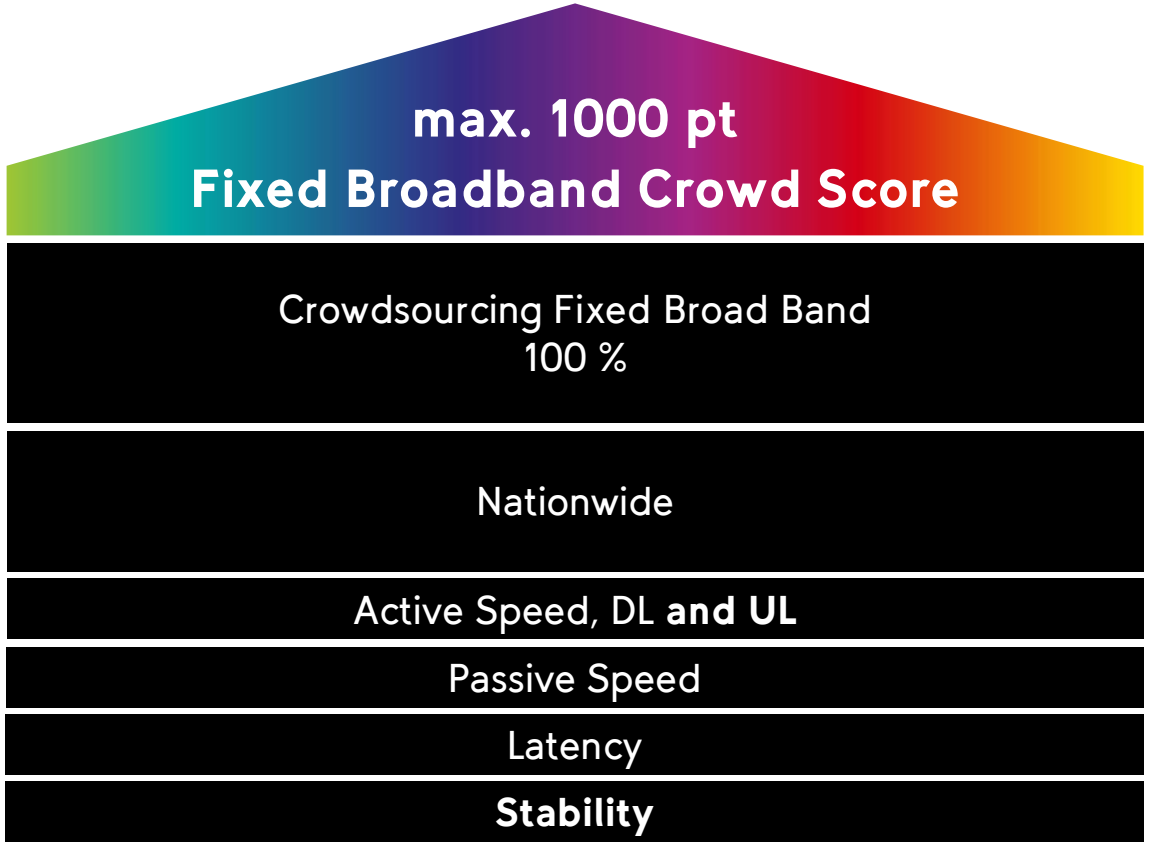
# umlaut Score Family.
## Modularity and Hierarchy.

umlaut delivers user experience and performance ratings for the communications and other industries. The family of umlaut score products is depicted below and constantly being expanded.

**This document focuses on the Fixed Broadband Score.**



# **umlaut Score Modules**
## Modularity & Hierarchy of Fixed Broadband.



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## Disclaimer