

# draft-ietf-bmwg-mlrsearch-07

IETF-120 Vancouver, BMWG Meeting

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# MLRsearch Update

- draft-ietf-bmwg-mlrsearch-07 posted on 21st of July 2024.
- Changes from -06
  - Substantial edits in MLRsearch Specification section.
  - Added Search Goal Examples for compatibility with RFC2544 and TST009 goals.
  - Added note on implementation compliance.
  - Overall focus on improving clarity of definitions, discussions and references.
- BMWG next steps
  - Draft ready for BMWG Last Call.

# MLRsearch Update - Topics

- Problems
- Specification
  - Existing Terms
  - Trial Terms
  - Goal Terms
  - Search Goal Examples
  - Result Terms
  - Architecture
  - Implementation Compliance
- Work Status as of -07
- References

# Problems

- **Long Search Duration** => Let's shorten it by finding interesting region faster.
- **DUT in SUT** => Use performance spectrum.
- **Repeatability and Comparability** => Improve with performance spectrum and conditional throughput.
- **Throughput with Non-Zero Loss** => Address a common practice in SW networking.
- **Inconsistent Trial Results** => Address this new phenomena resulting from repeated trials at the same load and multiple search goals.

# Specification 1/11 – Existing Terms

Relying on existing definitions without any deviations

- **SUT**
- **DUT**
- **Trial**

# Specification 2/11 – Trial Terms

Some new, some existing terms with deviations

- **Trial Duration:** intended duration.
- **Trial Load:** intended load.
- **Trial Input:** composite of trial duration and trial load.
- **Traffic Profile:** composite of other quantities including frame sizes, burst profile.

# Specification 3/11 – Trial Terms

Some new, some existing terms with deviations

- **Trial Forwarding Ratio:** ratio of { (#frames forwarded) / (#frames sent by tester) }.
- **Trial Loss Ratio:** 1 minus Trial Forwarding Ratio.
- **Trial Forwarding Rate:** Trial Load multiplied by Trial Forwarding Ratio.
- **Trial Effective Duration:** by default equal to Trial Duration.
- **Trial Output:** composite of Trial Loss Ratio, Trial Effective Duration and Trial Forwarding Rate.
- **Trial Result:** composite of Trial Input and Trial Output.

# Specification 4/11 – Goal Terms

Some new, some existing terms with deviations

- **Goal Final Trial Duration:** threshold value for trial durations.
- **Goal Duration Sum:** threshold value for a particular sum of trial effective durations.
- **Goal Loss Ratio:** threshold value for Trial Loss Ratios.
- **Goal Exceed Ratio:** threshold value for a particular ratio of sums of Trial Effective Durations.
- **Goal Width:** threshold value used for deciding if two trial loads are close enough.



# Specification 5/11 – Goal Terms

Some new, some existing terms with deviations

- **Search Goal:** composite of several attributes including
  - Required attributes:
    - Goal Final Trial Duration,
    - Goal Duration Sum,
    - Goal Loss Ratio,
    - Goal Exceed Ratio.
  - Optional attribute:
    - Goal Width.
- **Controller Input:** list of Search Goal instances

# Specification 6/11 – Search Goal Examples

## RFC2544 Goal

The following set of values makes the search result unconditionally compliant with [RFC2544] (section 24 Trial duration)

- Goal Final Trial Duration = 60 seconds
- Goal Duration Sum = 60 seconds
- Goal Loss Ratio = 0%
- Goal Exceed Ratio = 0%

# Specification 7/11 – Search Goal Examples

## TST009 Goal

[TST009] (section 12.3.3 Binary search with loss verification) describes one of the alternatives to RFC2544:

- repeat lossy trials, hoping for zero loss on second try,
- so the results are closer to the noiseless end of performance spectrum,
- and more repeatable and comparable.

For example, for "r = 2" variant<sup>(1)</sup>, the following search goal should be used:

- Goal Final Trial Duration = 60 seconds
- Goal Duration Sum = 120 seconds
- Goal Loss Ratio = 0%
- Goal Exceed Ratio = 50%

<sup>(1)</sup> From TST009 section 12.3.3: "r is a variable tracking the number of verifications of a particular Offered Load level (The recommended value of  $\max(r) = 2$ ). r is initially set to 1."

# Specification 8/11 – Result Terms

- **Relevant Upper Bound:** the smallest trial load value classified at the end of search as upper bound.
- **Relevant Lower Bound:** the largest trial load value classified at the end of search as lower bound.
- **Conditional Throughput:** forwarding rate at Relevant Lower Bound of given Search Goal at the end of search.

# Specification 9/11 – Result Terms

- **Goal Result:** composite of Relevant Upper Bound and Relevant Lower Bound (REQUIRED), Conditional Throughput (RECOMMENDED).
- **Search Result:** composite object mapping Search Goal instance to a corresponding Goal Result instance.
- **Controller Output:** composite quantity returned from the Controller to the Manager at the end of the search. The Search Result instance is its only REQUIRED attribute.

# Specification 10/11 – MLRsearch Architecture

- MLRsearch architecture consists of three main system components:
  - the **Manager**, the **Controller**, and the **Measurer**.
- **Measurer**: component tasked to perform trials
  - when called with a Trial Input instance,
  - performs one Trial,
  - and returns a Trial Output.
- **Controller**: component tasked to select trial loads and durations
  - when called with a Controller Input instance,
  - repeatedly computes Trial Input instance for the Measurer,
  - obtains corresponding Trial Output instances,
  - and eventually returns a Controller Output instance.
- **Manager**: component tasked to pre-configure everything and to produce the test report
  - responsible for configuring other components,
  - calling the Controller component once,
  - creating the test report following the reporting format as defined in [RFC2544] (section 26. Benchmarking tests).

# Specification 11/11 – Implementation Compliance

- Any networking measurement setup
  - where there can be logically delineated system components, and
  - there are components satisfying requirements for
    - the Measurer,
    - the Controller and
    - the Manager,
- is considered to be compliant with MLRsearch specification.

# MLRsearch Work Status

- Draft is ready for BMWG Last Call.



# References

- MLRsearch Applied
  - LFN FD.io CSIT: <https://csit.fd.io>
- SW Networking Benchmarking
  - GCP Blogs: 100Mpps with FD.io VPP on x86
    - [Forwarding over 100 Mpps with FD.io VPP on x86](#)
    - [Forwarding over 100 Mpps with FD.io VPP on x86 — Part2](#)

THANK YOU !

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