



A Benchmarking Framework for Easy and Reliable Wireless Experimentations

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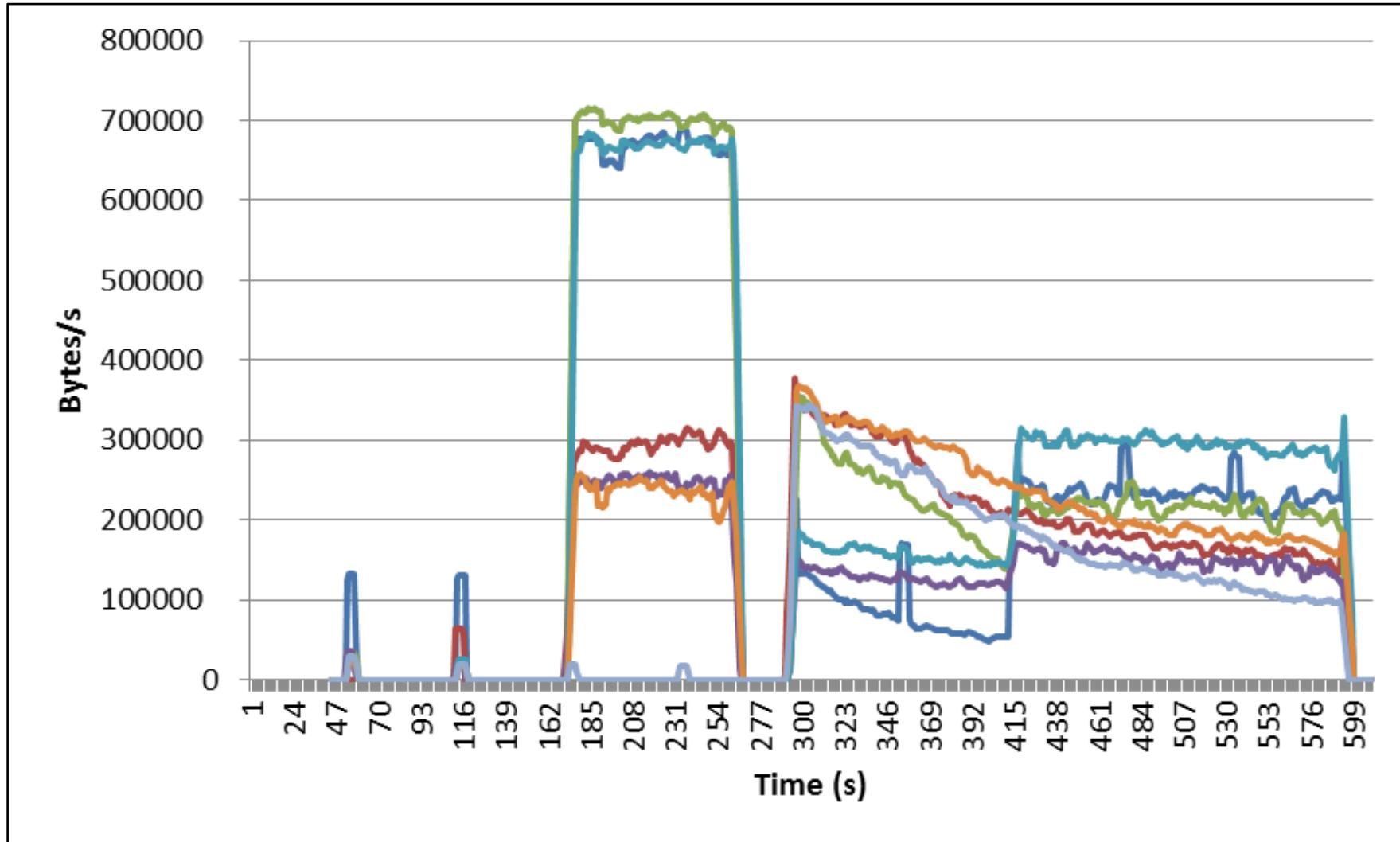


OUTLINE

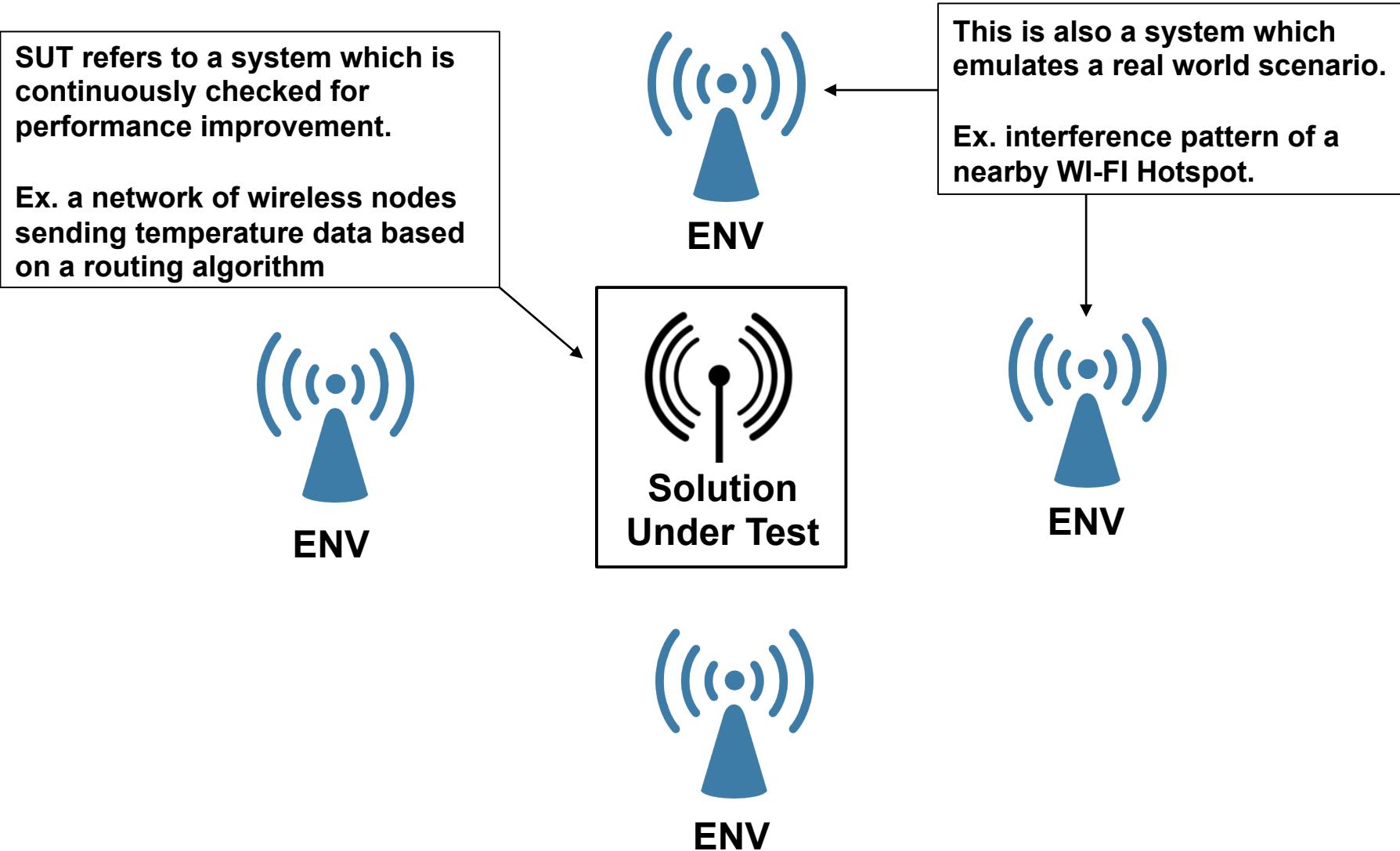


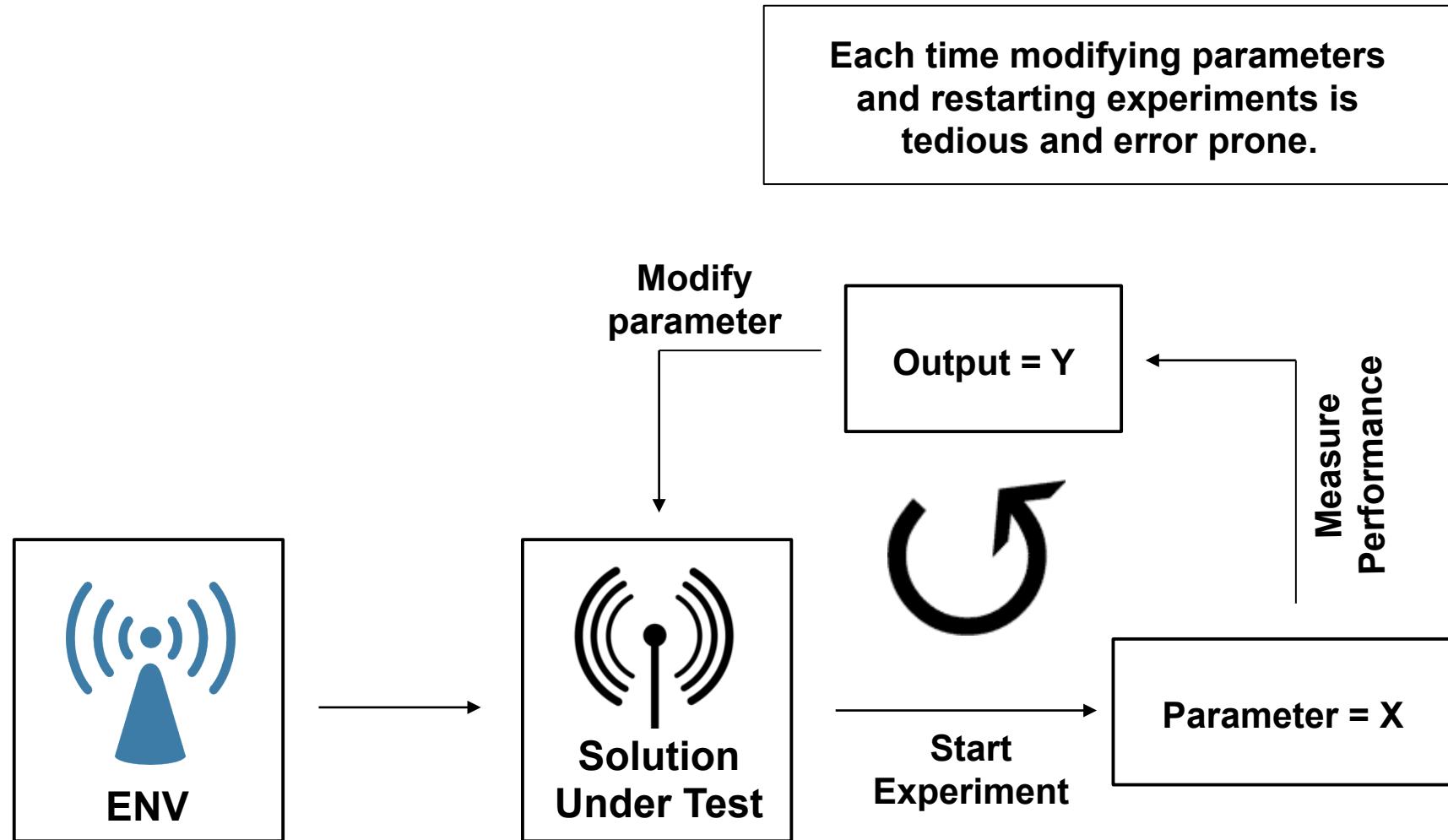
- **The need for benchmarking framework**
- **Proposed solution**
- **Proof of concept**
- **Conclusion and future work**

Repeatability of experiments



Configuration of wireless experiments





Documentation and reuse of experiments

Conference Papers

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In 2008, I was program chair for WiSym, the ACM Symposium for wireless. I think I was asked to serve in this post because WiSym is a relatively young conference and I've had a good deal of experience on relevant committees. When I chose the WiSym program committee, I made a special effort to include an exceptional diversity of professional and scholarly accomplishments in order to reflect the broad interests of the wireless community. That means the Program Committee included a number of business leaders and professionals who don't usually participate in academic conferences, much less on program committees. To help them, and to keep everyone on the same page, I wrote the discussion of reviewing.

In computer science, conferences are often the primary means of scientific communication, and conference papers are often cited more frequently than stringently as journal papers. Despite the importance of the process, not much has been written on the subject.

On the Purpose of Refereeing

The primary duty of the conference committee is to ensure that the quality and relevance of the research literature. People who attend the conference, or who consult its Proceedings in the future, will be able to trust that the results reported here are honest, accurate, and may be relied upon.

Note that this is quite different from the duty of a commercial conference such as TED or CES, which must consider first what might best attract and entertain its customer. We would very much like to

1. Newly the ACM Wireless Conference on whose program committee I've served some seventeen times (including two stints as co-chair).
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The wireless experiment is conducted in an environment using two nodes one acting as a sender and the other acting as a receiver.

This way, performance is improved by a factor of 4.5 for this configuration.

The Question is, will a different experimenter make use of such a result to his/her work?

Experimenters usually focus on results and thus making it difficult to re-construct and benchmark their experiments with other experiments



Needs for Benchmarking Framework



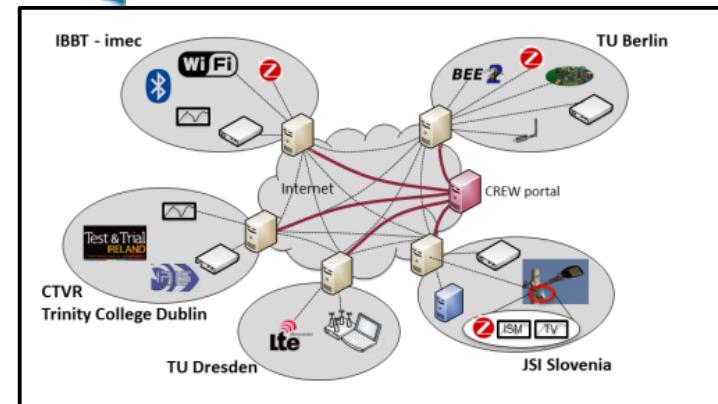
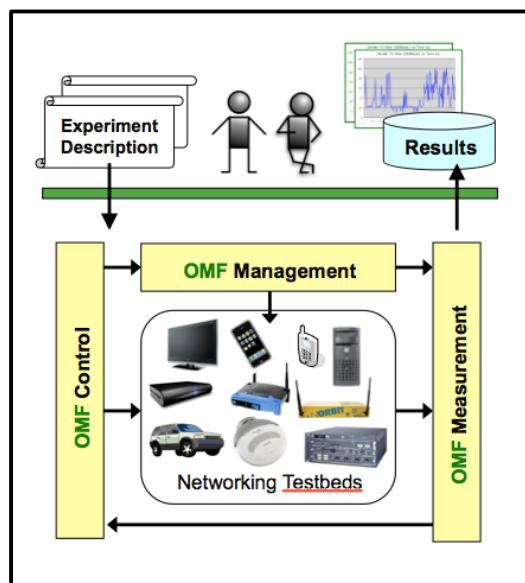
- **Make repeatability of experiments possible**
- **Put aside time consuming and error prone experiment configuration of the environment**
- **Leave the burden from experimenters and help them focus on their Solution Under Test**
- **Making parameter space optimization experiments possible**
- **Reuse and built further from others experiment result**

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What is CREW BM Framework?





CREW Benchmarking Framework



Front View

Experimentation Section

[Start New Configuration](#)

Load/Configure Experiment

No file chosen

► **Load/Execute Experiment**

Result Analysis

Solution One

Config No file chosen

Database No file chosen



Solution Two

Config No file chosen

Database No file chosen



Inside CREW Benchmarking Framework



Experiment configuration

Experiment Abstract

Title : Interference environment

Author : Wei Liu

Contact Information : wei.liu@intec.UGent.be, gaston crommenlaan 8, 9050 Gent, Belgium

Experiment summary :

Three pair of nodes create repeatable interference patterns. UDP streams of 30Mbps are used for the experiment.

Experiment duration (sec) : 256

Applications included in experiment

Default Custom Delete

Platform x86Linux ▾

Application iperf ▾

Version 2.0.5

Description perform network throughput tests

▶ Input Format

▶ Output Format

Nodes included in experiment

Select nodes Zotac22 Image select image ▾ Delete

Interface	Mode	Channel	ESSID	IP	Action
wlan0	managed	1	INT1	192.168.0.22	X

Add Interface

Application Inst ID Report Parameter TimeLine Action

Application	Inst ID	Report	Parameter	TimeLine	Action
iwconfig	ClientA_iwconfig	<input type="checkbox"/>			X
iperf	ClientA_iperf	<input type="checkbox"/>			X

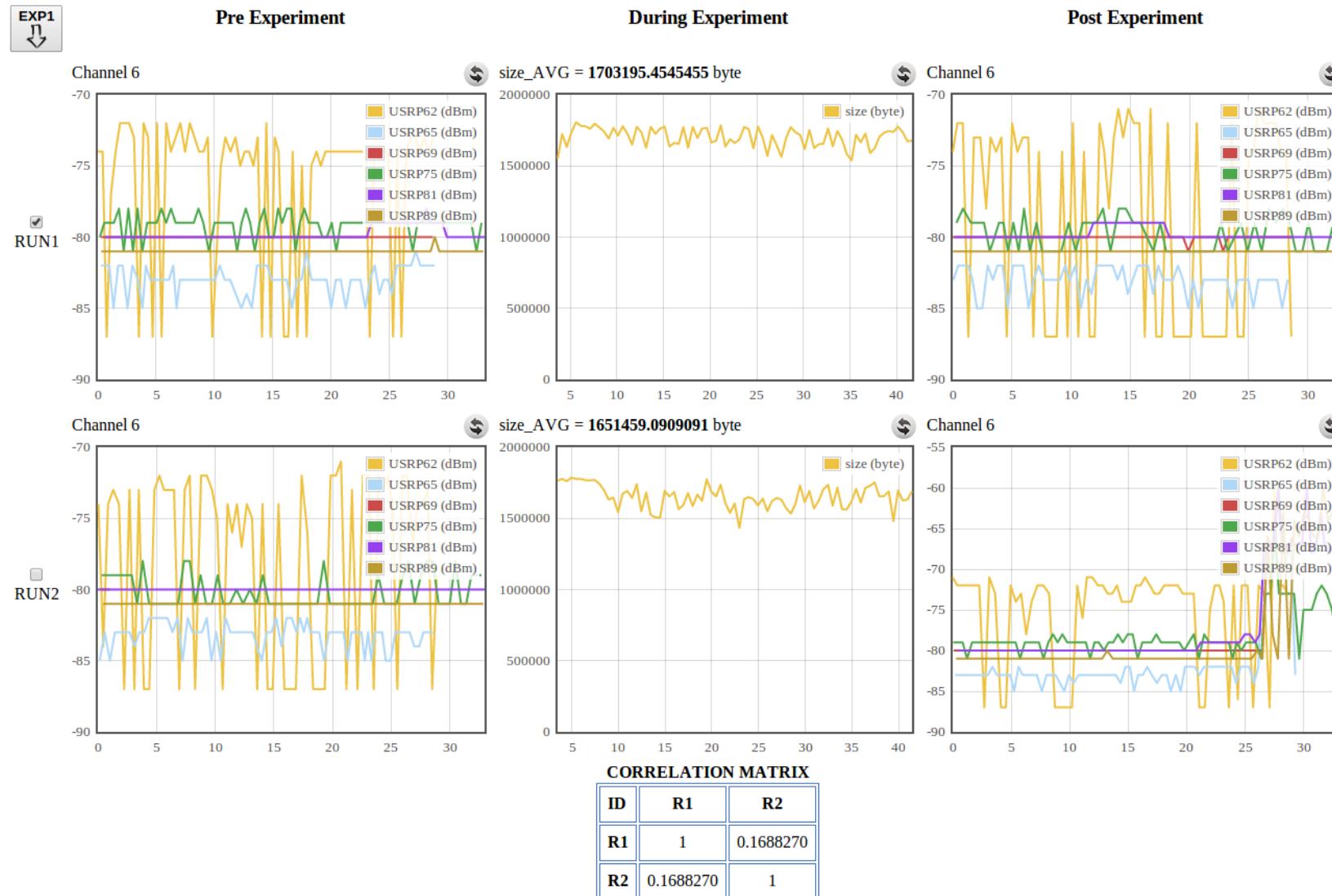
Add Application



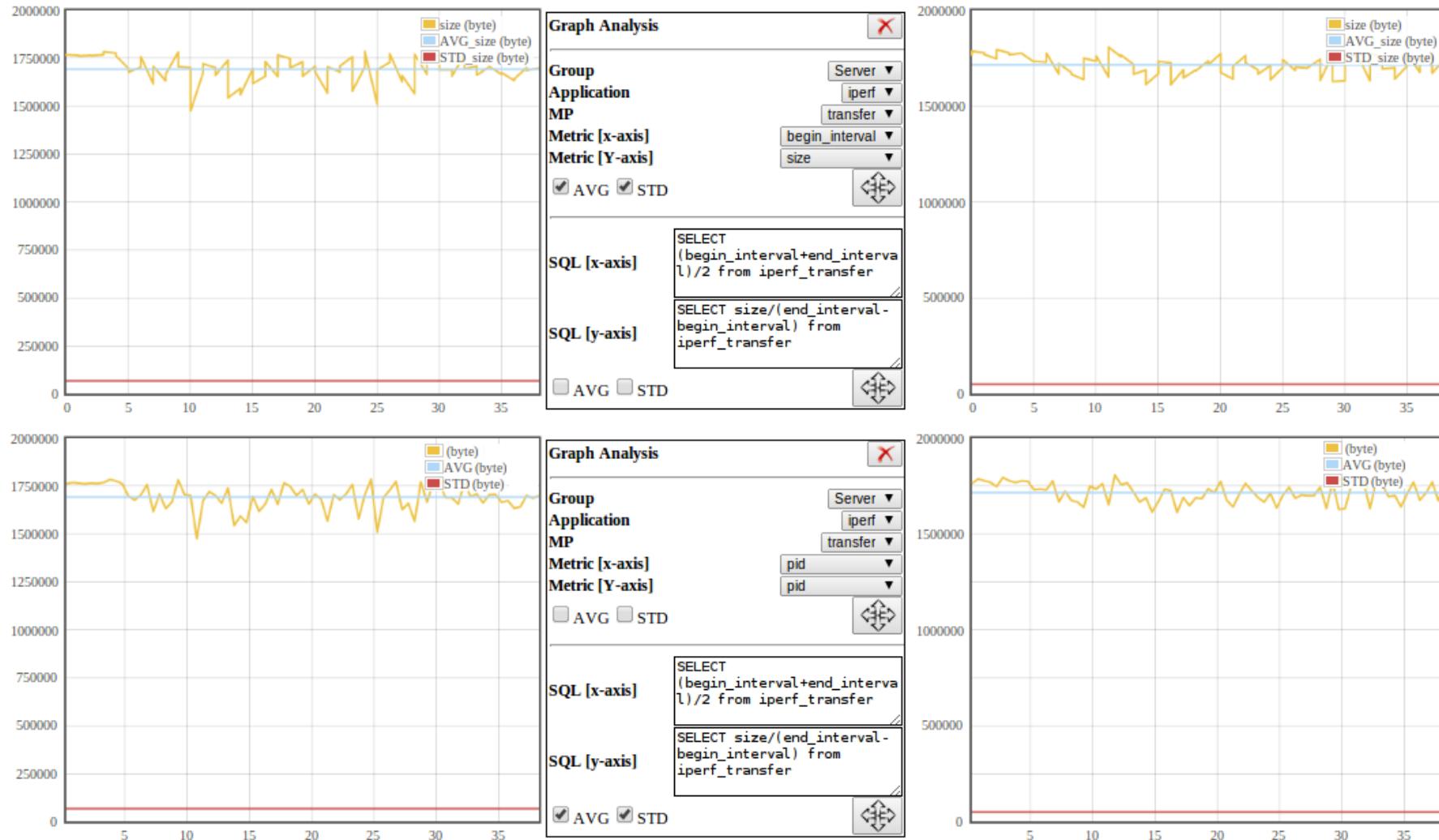
Inside CREW Benchmarking Framework



Experiment execution



Experiment benchmarking: result analysis

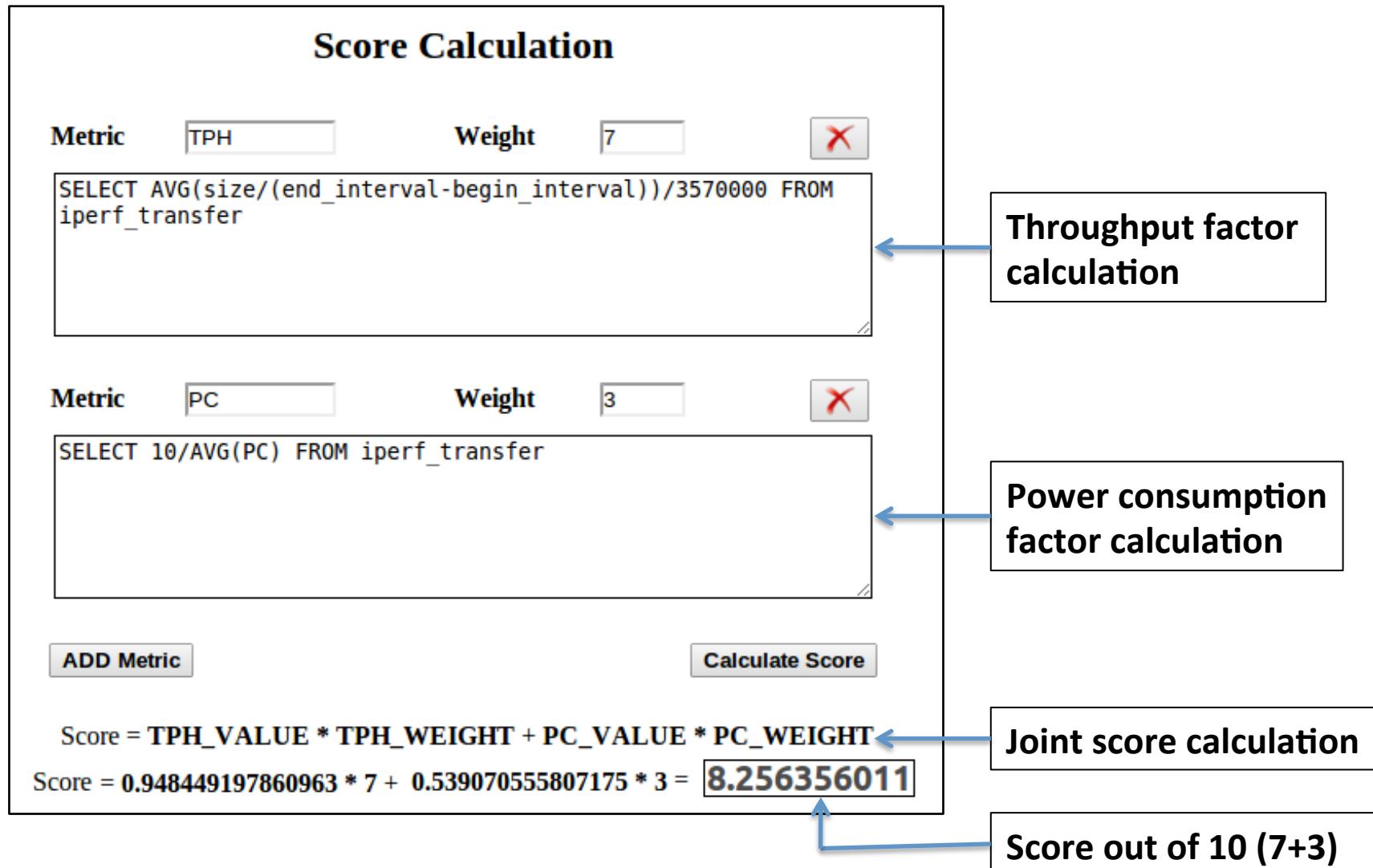




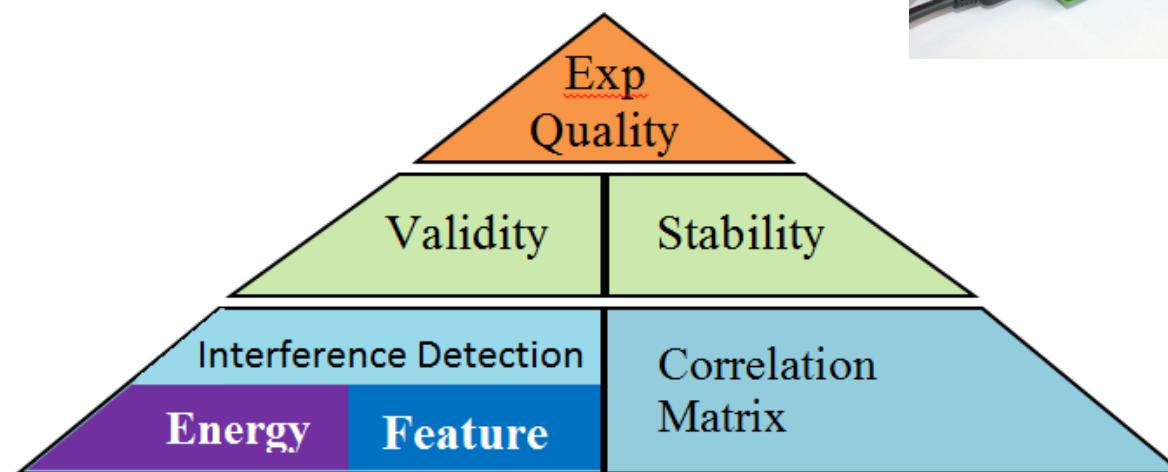
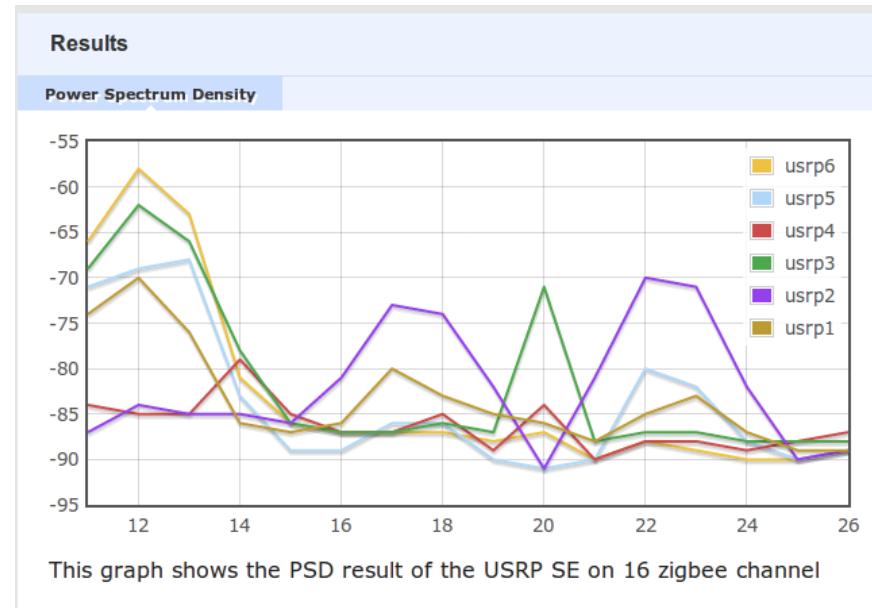
Inside CREW Benchmarking Framework



Experiment benchmarking: score calculation



Experiment Validity and Stability





Inside CREW Benchmarking Framework



Experiment Validity :- Interference Detection

Time



Space

Distributed spectrum sensing





Inside CREW Benchmarking Framework



Experiment Stability

- Repeat experiment
- Cross correlation
- Outliers identification

Round	R1	R2	R3	R4
R1	1	0.2	0.78	0.97
R2	0.2	1	0.84	0.43
R3	0.78	0.84	1	0.93
R4	0.97	0.43	0.93	1

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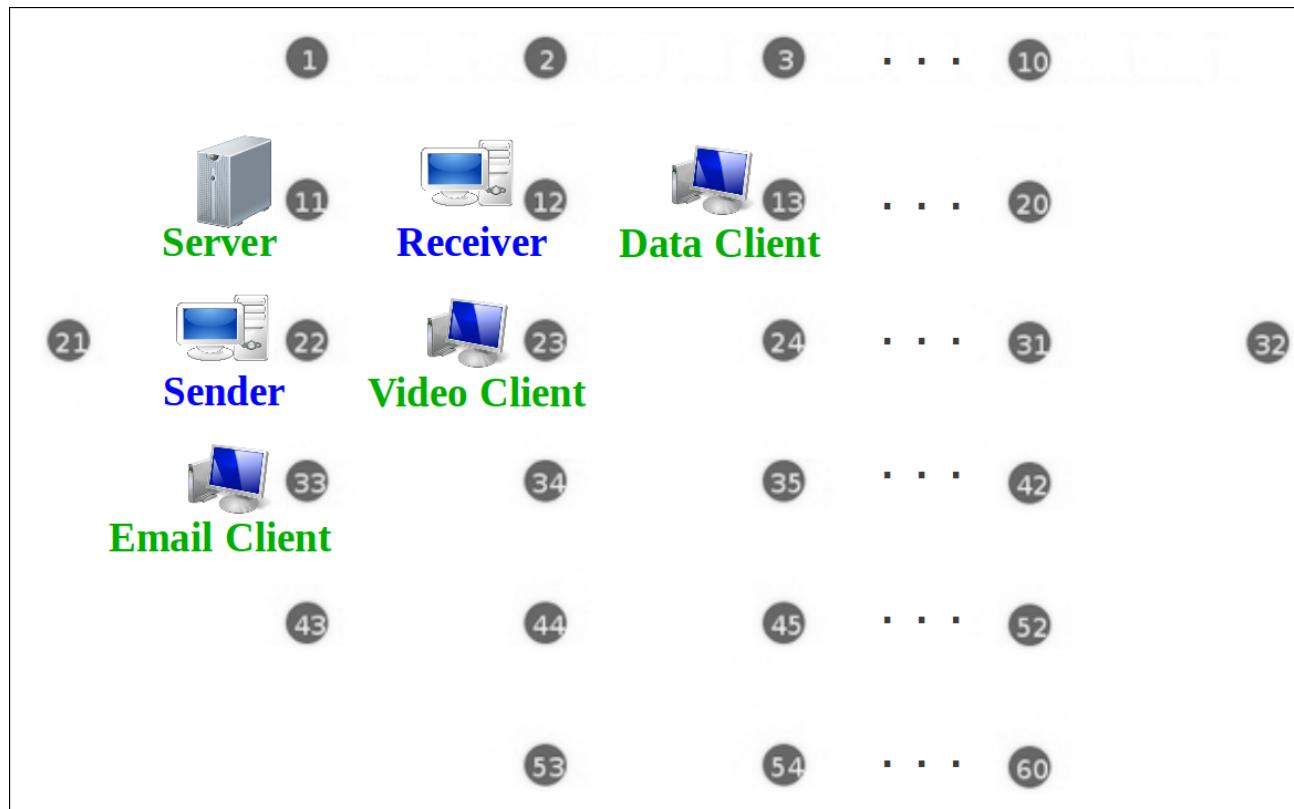
TCP window size optimization



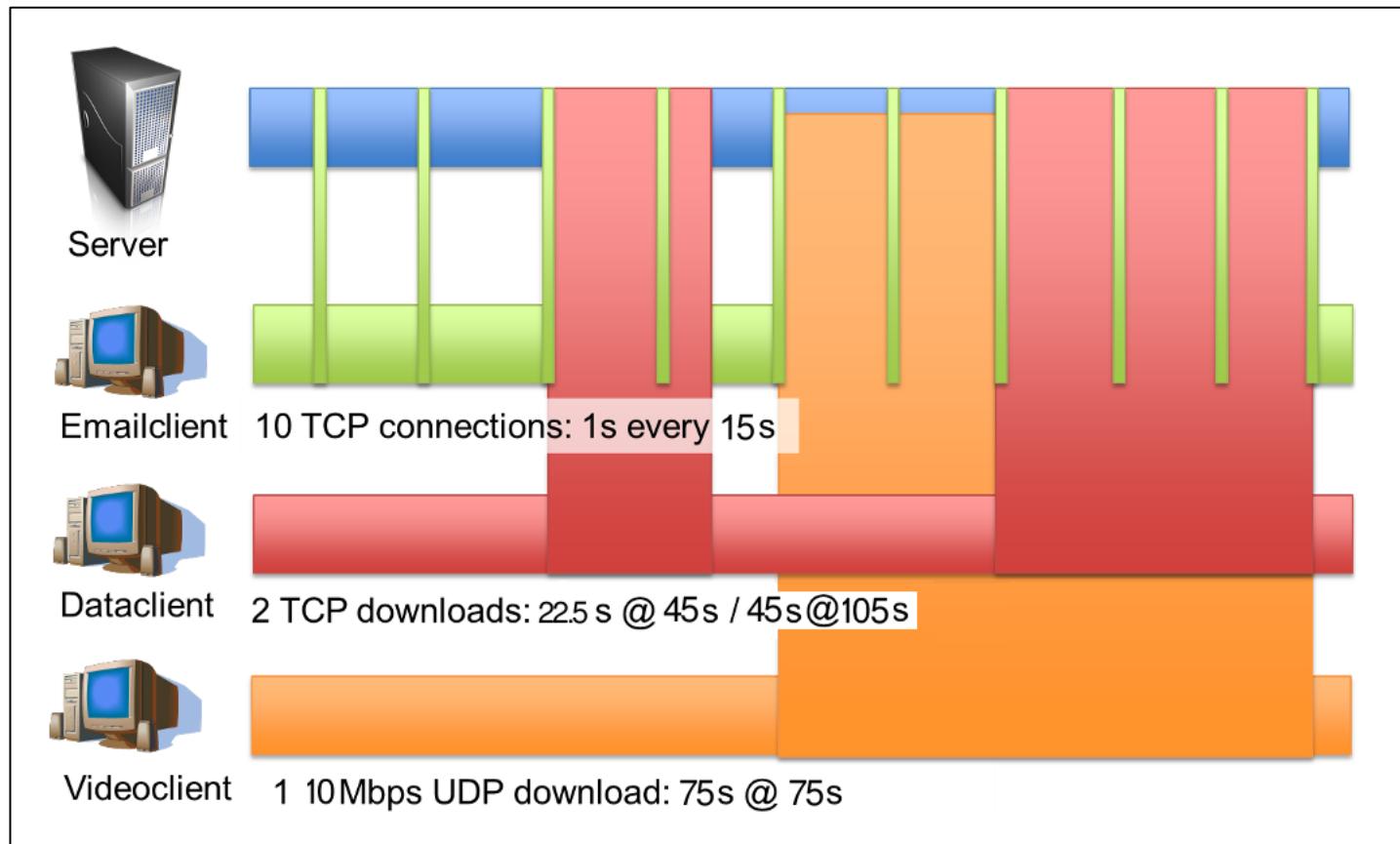
Objective

- Show how optimal parameter searching is conducted.
- Show the efficiency of using advanced searching methods like incremental search method within CREW benchmarking framework.

Experiment layout



Experiment scenario

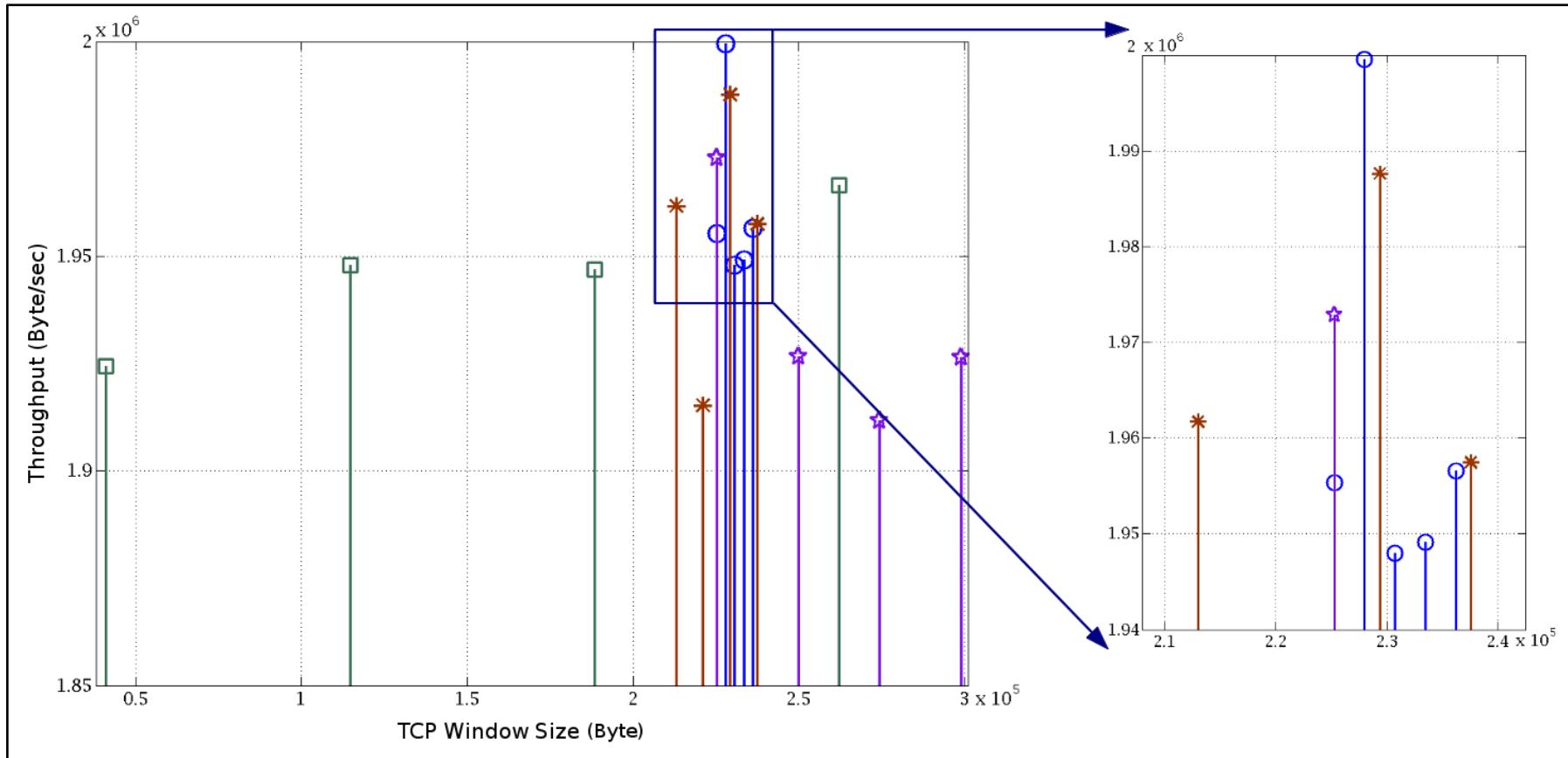




TCP window size optimization



Experiment result



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- **Why benchmarking is needed**
- **Our contribution**
 - Easy setup
 - Intelligent schedule
 - Parameter searching
 - Reliability
- **Focus of the near future**
 - Extend parameter searching algorithm
 - Portability and flexibility

Questions?

