NAVAL POSTGRADUATE SCHOOL

MONTEREY, CALIFORNIA

SUPPLEMENTAL TO DISSERTATION (1 OF 1: ACTIVITY TIMELINES)

EXPLORATORY DATA ANALYSIS OF DEFENSIVE CYBER DECEPTION EXPERIMENTATION

by

Michael Senft

June 2023

Dissertation Supervisor: James B. Michael

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13. ABSTRACT (maximum 200 words)

The use of cyber deception is a powerful but underutilized practice for spoiling cyber-attacker activity from initial reconnaissance to actions on an objective. This dissertation applies exploratory data analysis techniques to network traffic data collected during the Tularosa study, the largest experiment of defensive cyber deception involving human subjects to date. Using a network-graph–based information technology artifact developed for this research temporal variables of latency, frequency, and duration for system interactions were extracted from over 200 gigabytes of network traffic collected during the Tularosa study.

Analysis of the data bolsters previous assertions that decoy-based deception is significantly more effective against cyber-attackers when presence of deception is known and suggests this impact is enduring. Distinct temporal patterns for aggregated network traffic for each experimental group were also identified. This research also provides the first application of factor analysis to data collected during the Tularosa study, which highlighted the key role of technical experience in explaining observed variance. Finally, quantum probability theory is explored as a potential model to explain variations in latency observed between the control and experimental groups which may be the result of interference effect and/or order effect phenomena. Cyber-defenders can apply findings from this research to impede cyber-attacker activity.

14. SUBJECT TERMS cyber deception, deception, Tularosa study, decoy, network graph, network traffic, cyber, cybersecurity, quantum, quantum probability theory, exploratory data analysis, factor analysis	15. NUMBER OF PAGES 309
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SUPPLEMENTAL

This supplemental material includes detailed timelines of subject network activity for Day 1 and Day 2 experiment trials for the Tularosa Study.

Day 1 Subject Exclusions

Subjects S01, S02, S03, S04, S05, S33, S34, S35, S36, S37, S38, S39, S40, S41 and S42 were excluded from this analysis due to previously identified data collection issues resulting in the network traffic captured being invalid.

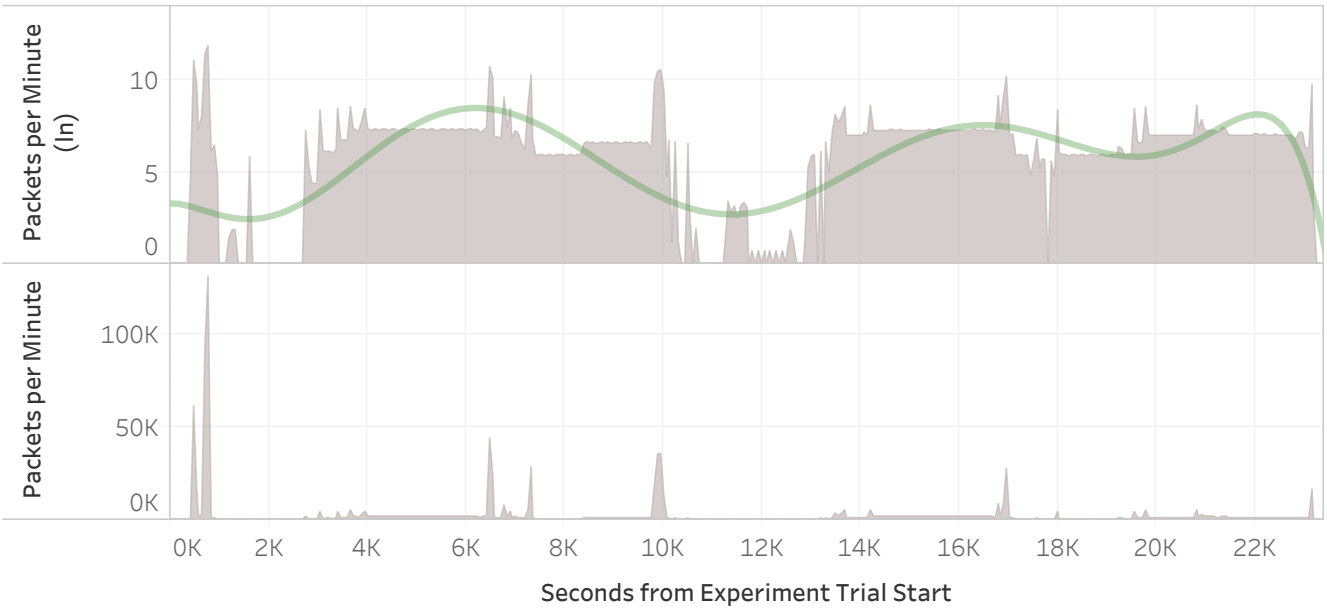
Subject S64 was excluded from this analysis due to the subject interacting with multiple systems on the cyber range network nearly 5 minutes prior to their designated start time.

Subject S69 was excluded from this analysis due to having been previously identified as an invalid subject.

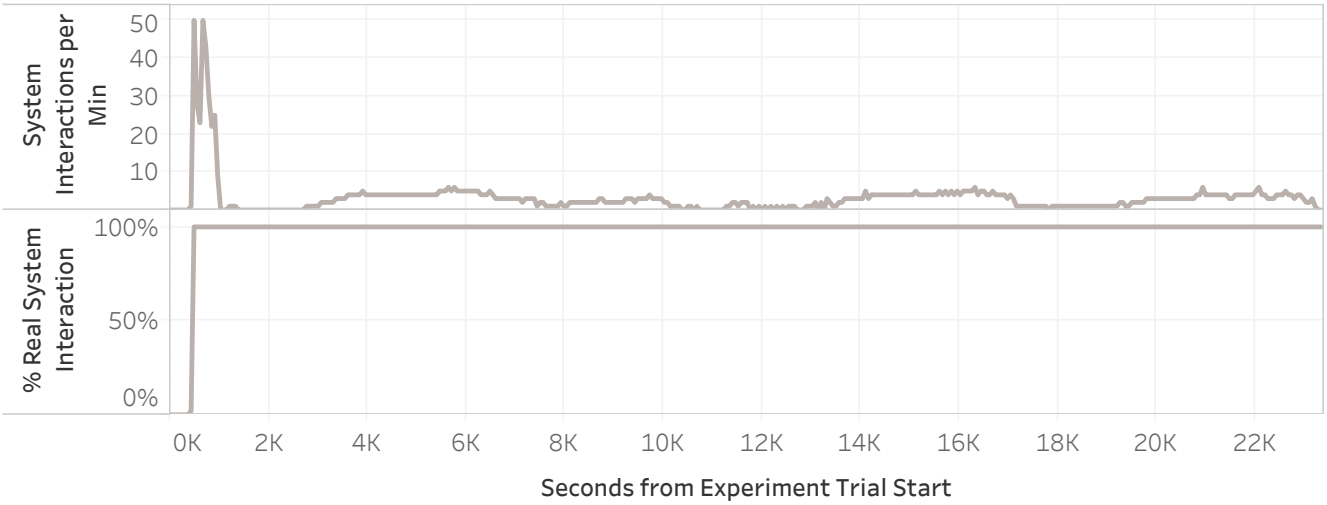
Subjects S15 and S110 were excluded from this analysis due to their interaction with only a single system on the cyber range network. This indicates they were either unable or unwilling to accomplish the reconnaissance task outlined in the briefing provided to each subject.

S06 - Day 1 - AU

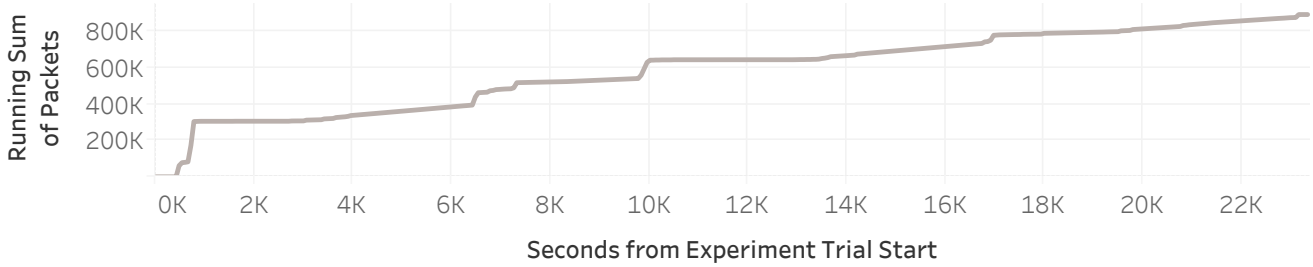
Real Packets per Minute



Real System Interaction Timeline



Running Sum of Packets



S07 - Day 1 - AU

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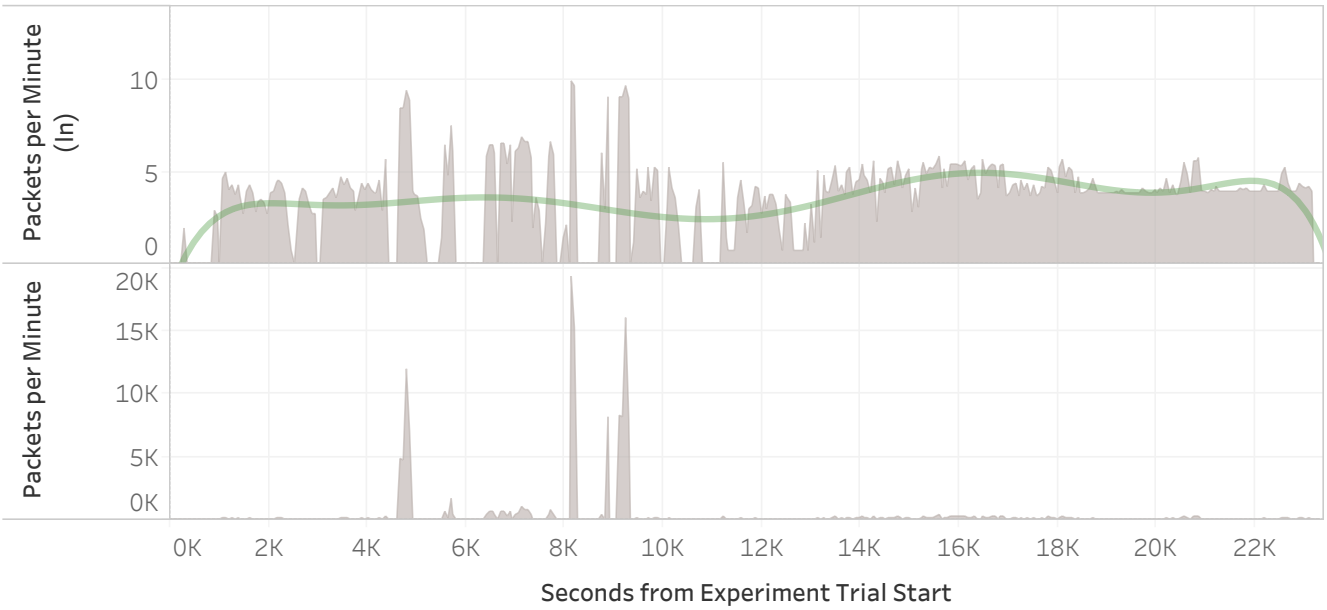
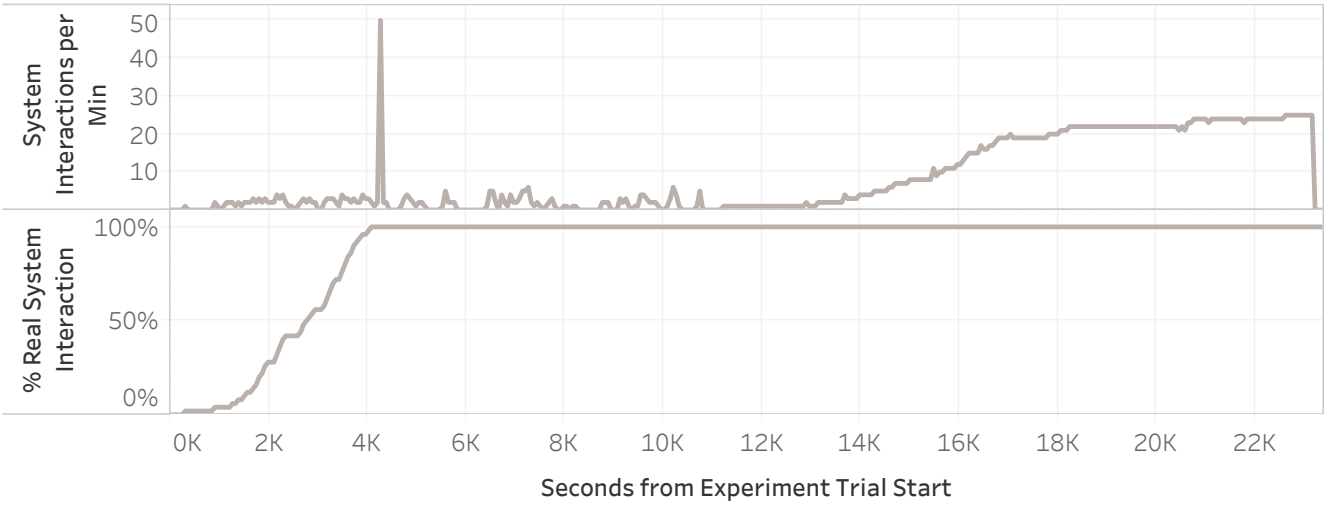
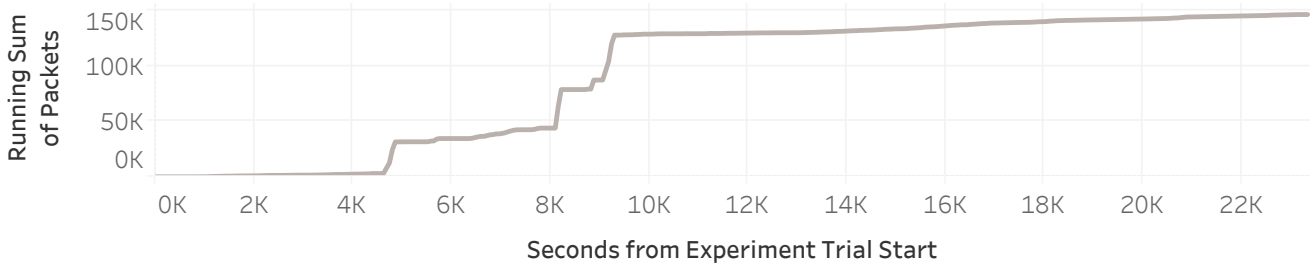


Real System Interaction Timeline

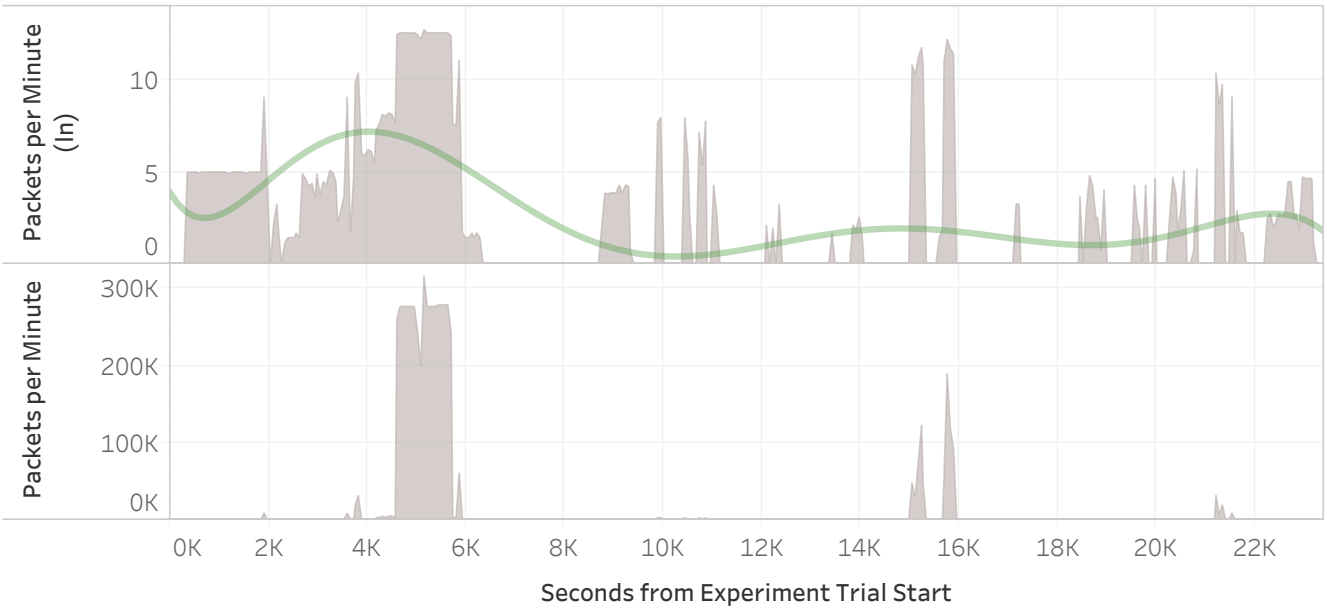


Running Sum of Packets

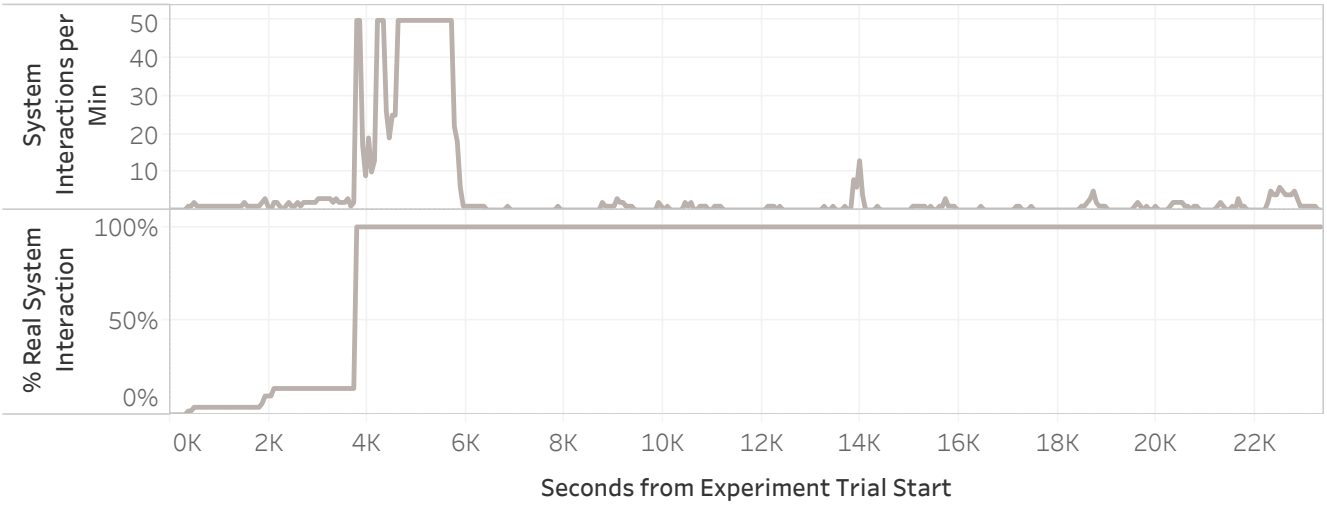


S08 - Day 1 - AU

Real Packets per Minute



Real System Interaction Timeline



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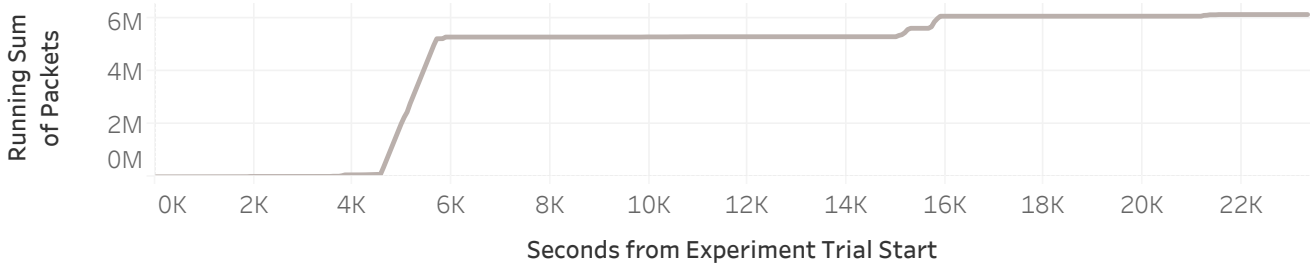
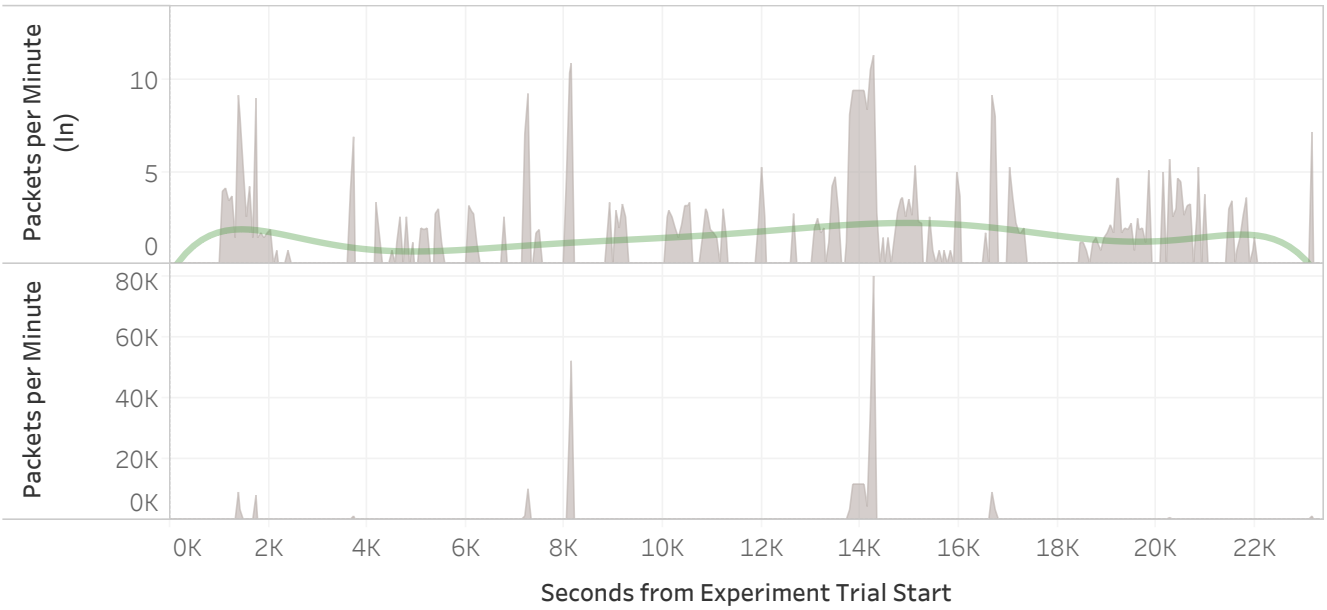
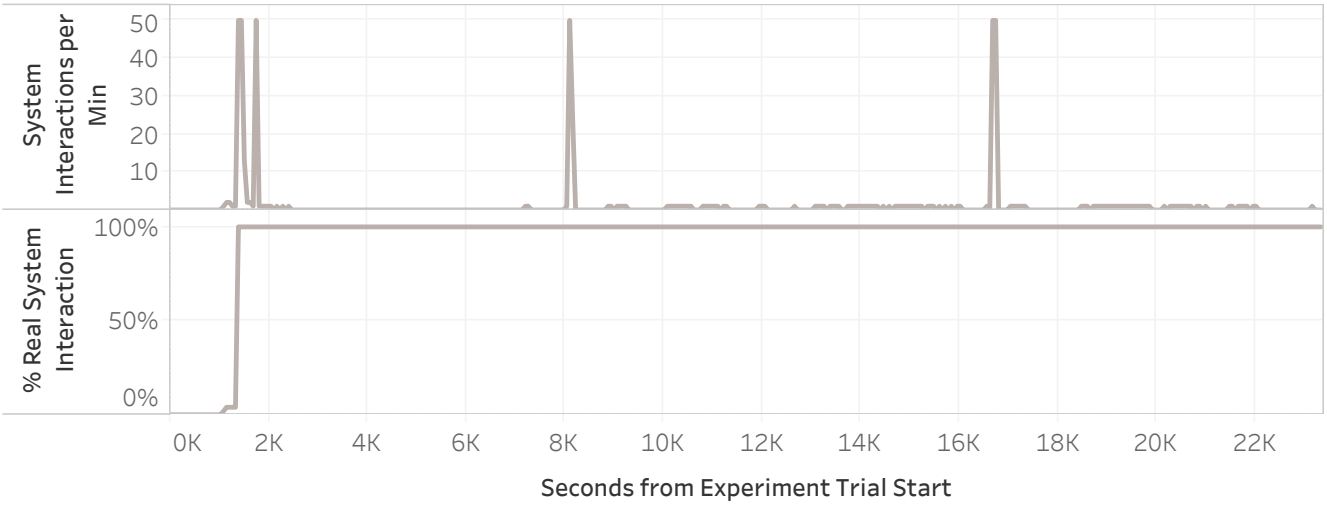


S09 - Day 1 - AU

Real Packets per Minute



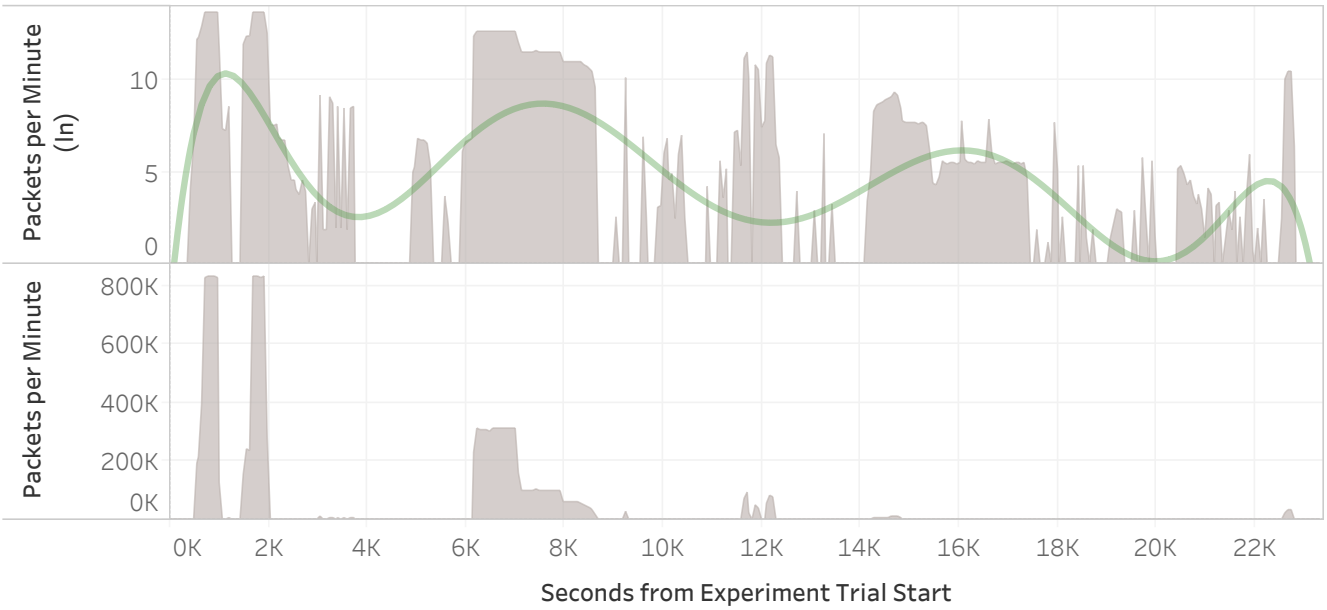
Real System Interaction Timeline



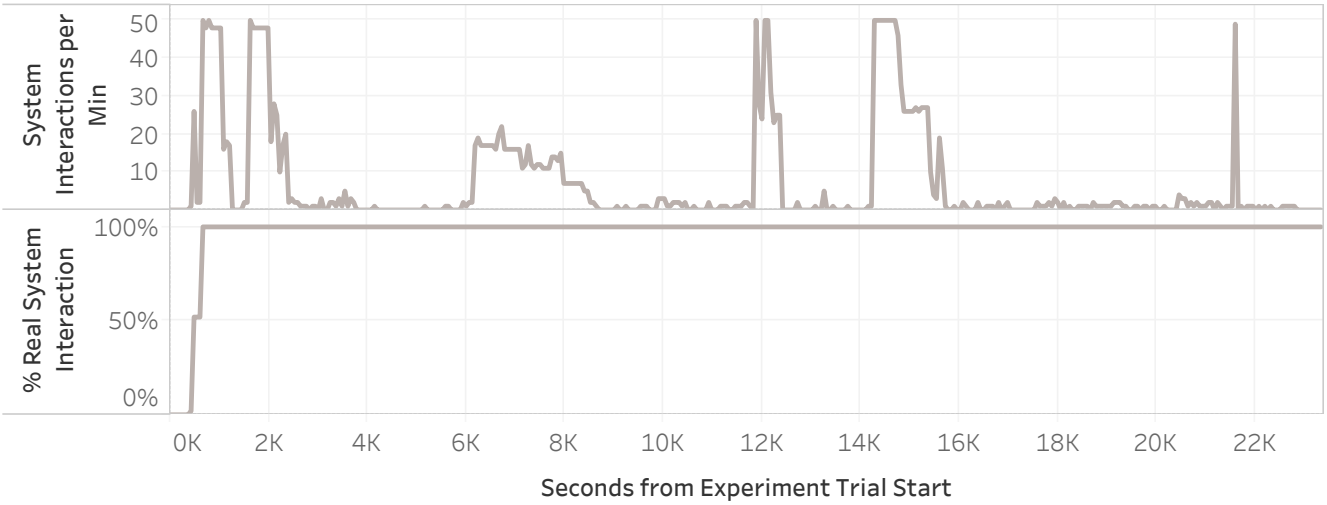
Running Sum of Packets

S10 - Day 1 - AU

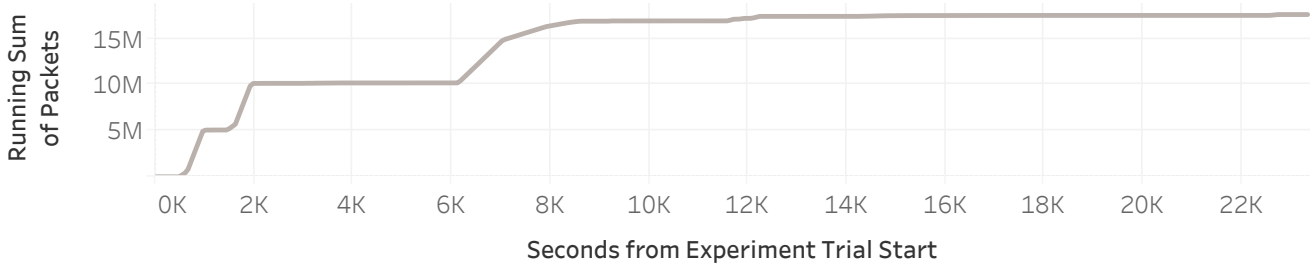
Real Packets per Minute



Real System Interaction Timeline

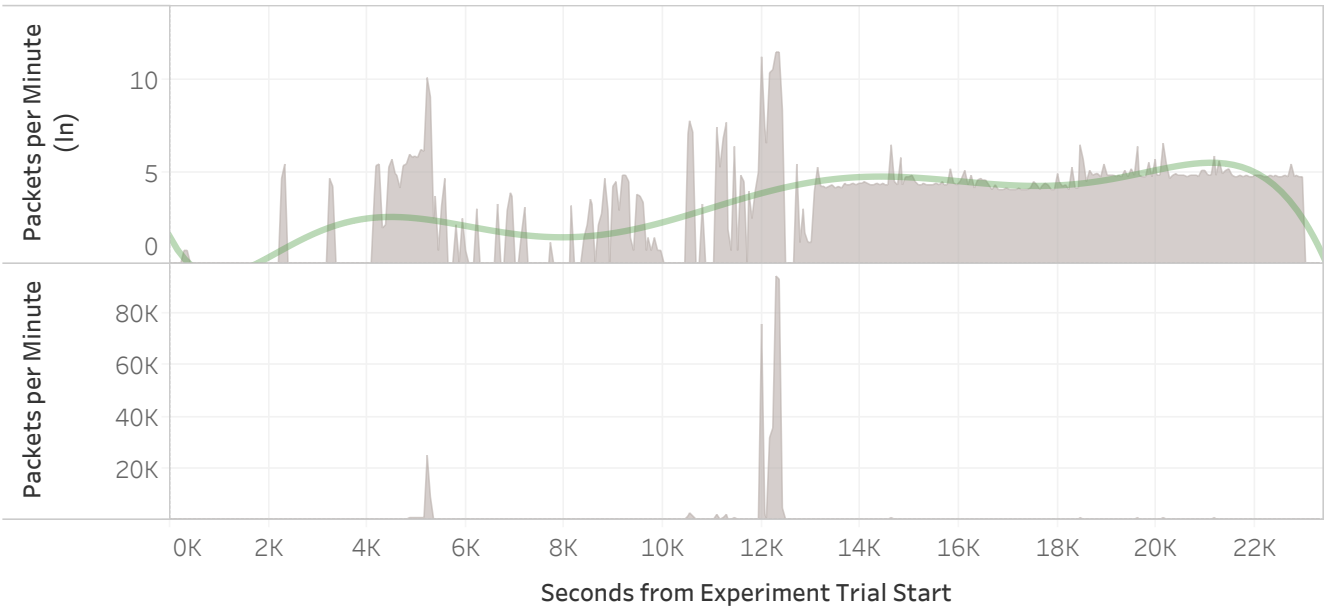


Running Sum of Packets

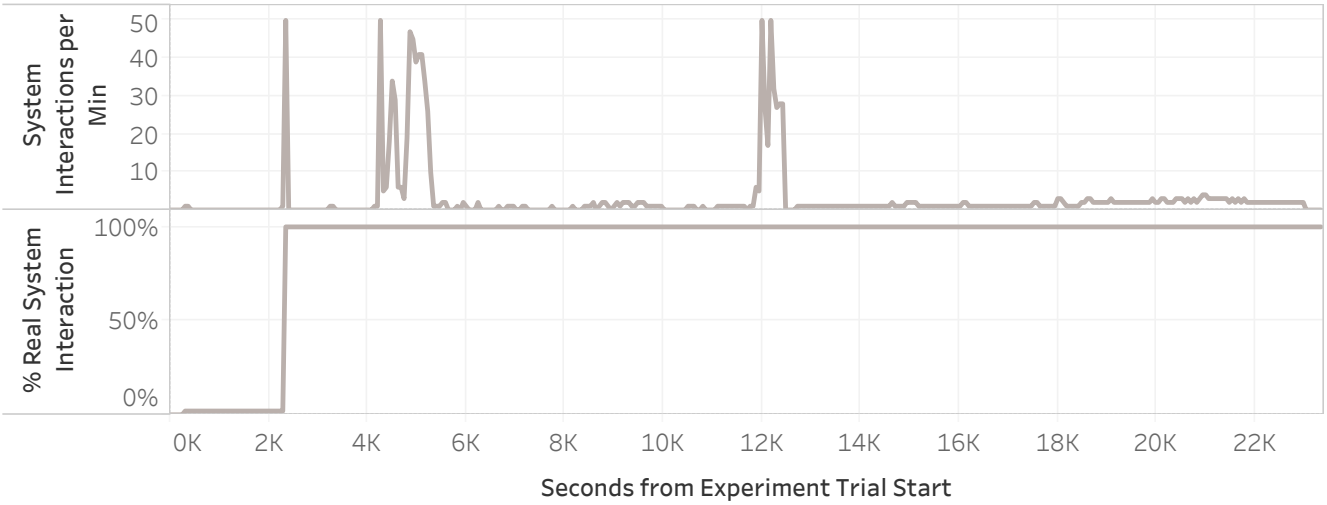


S11 - Day 1 - AU

Real Packets per Minute



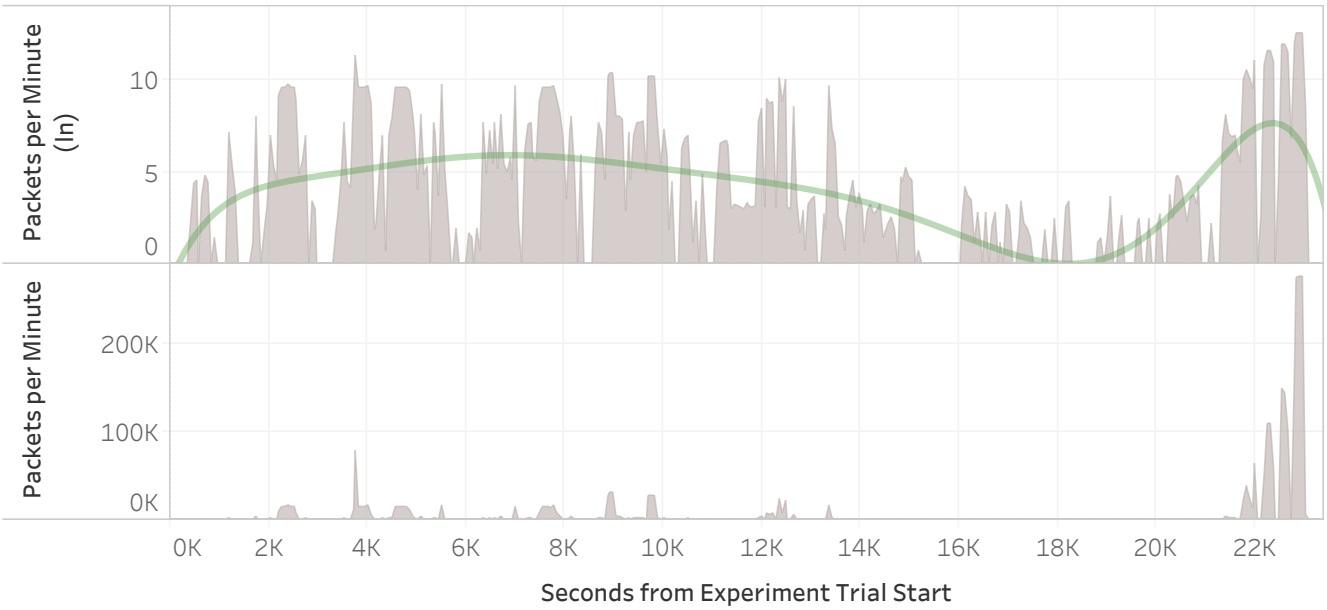
Real System Interaction Timeline



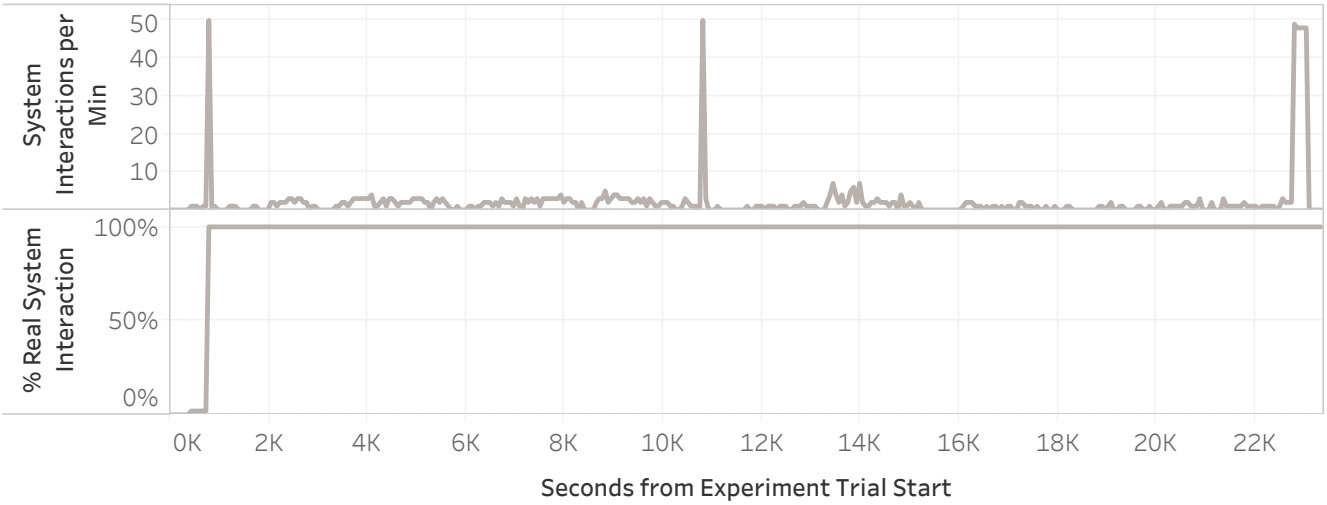
Running Sum of Packets

S12 - Day 1 - AU

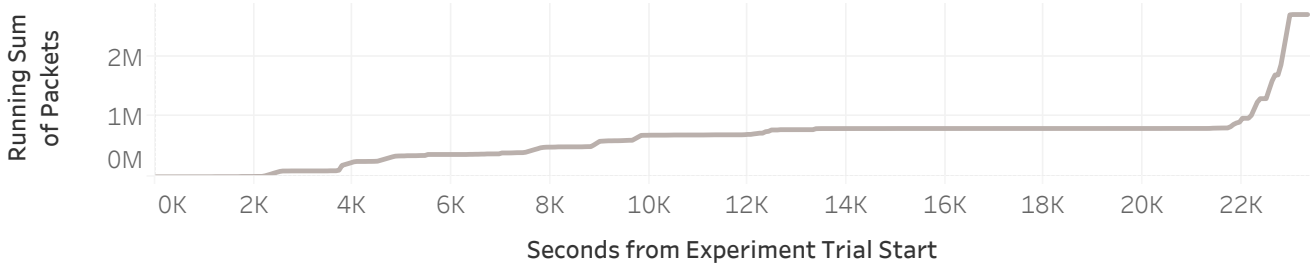
Real Packets per Minute



Real System Interaction Timeline

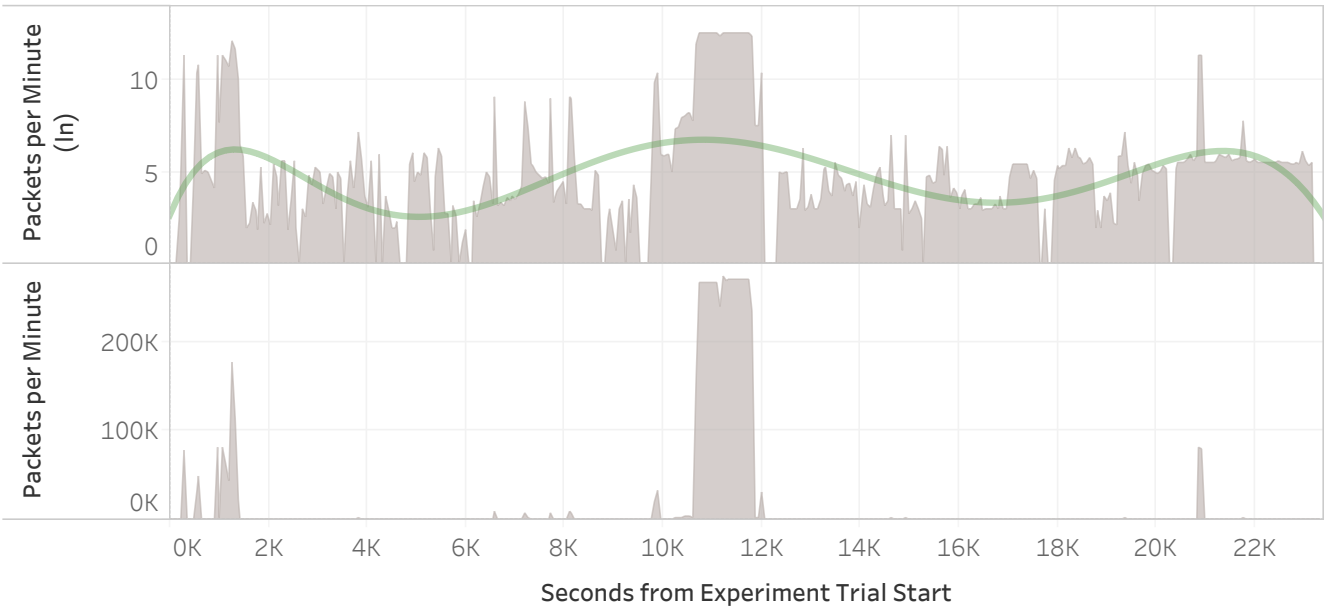


Running Sum of Packets

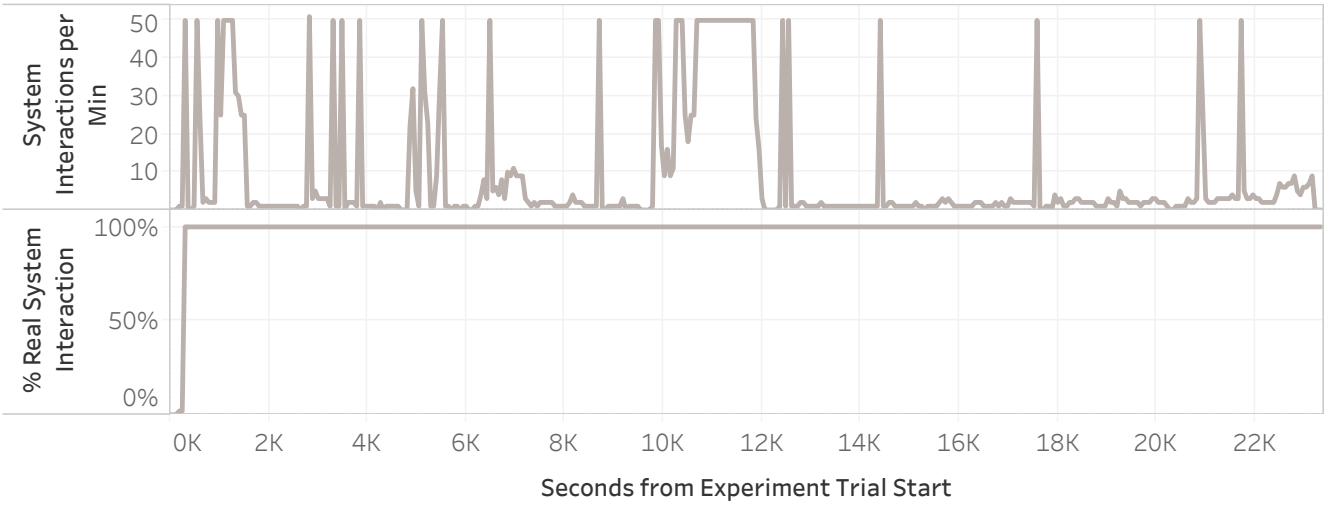


S13 - Day 1 - AU

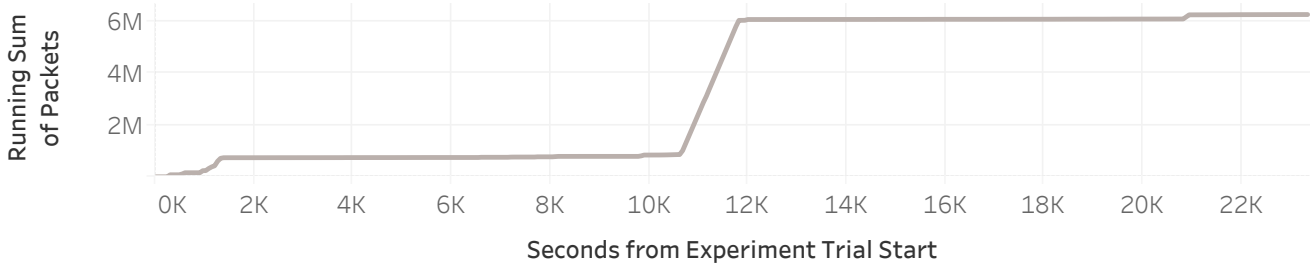
Real Packets per Minute



Real System Interaction Timeline



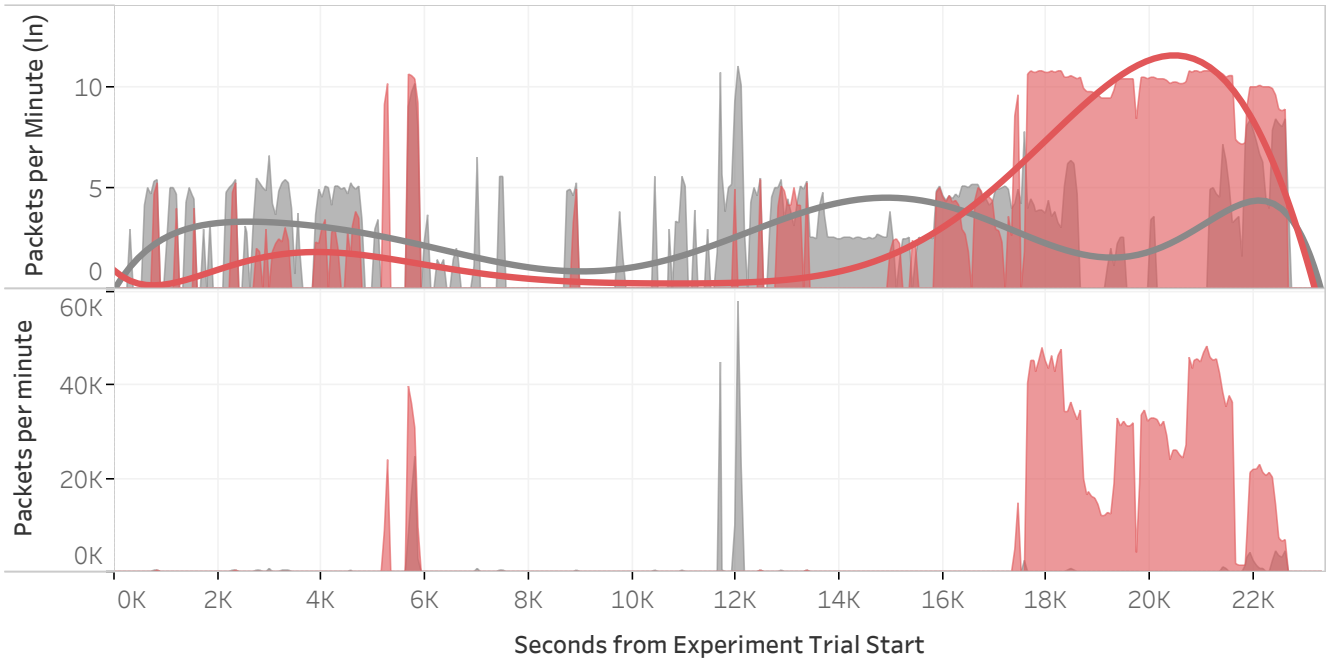
Running Sum of Packets



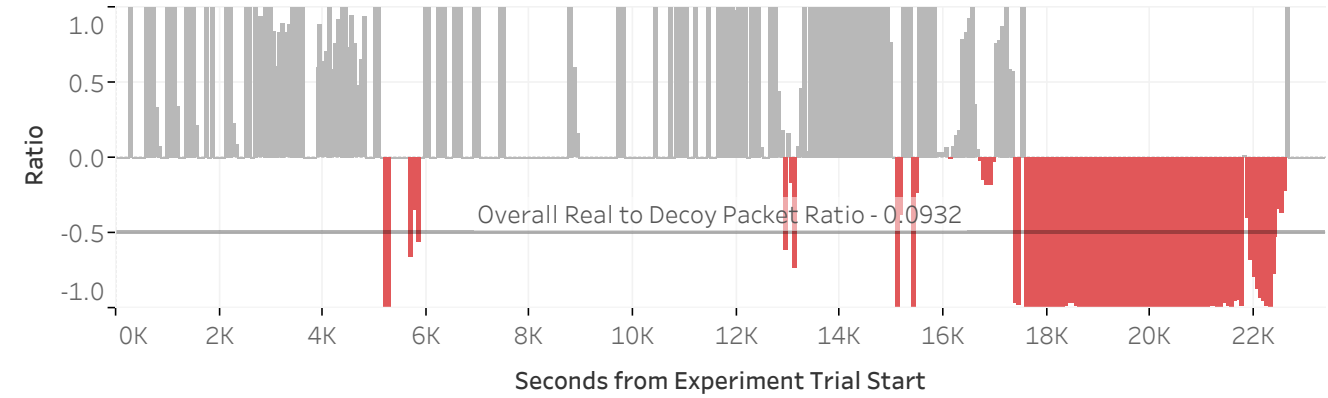
S14 - Day1 - PU

Legend
Real Systems
Decoy Systems

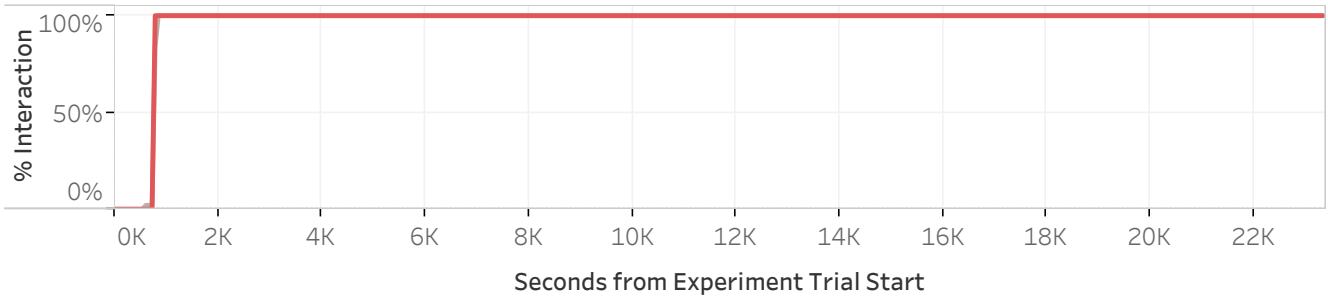
Real & Decoy Packets per Minute

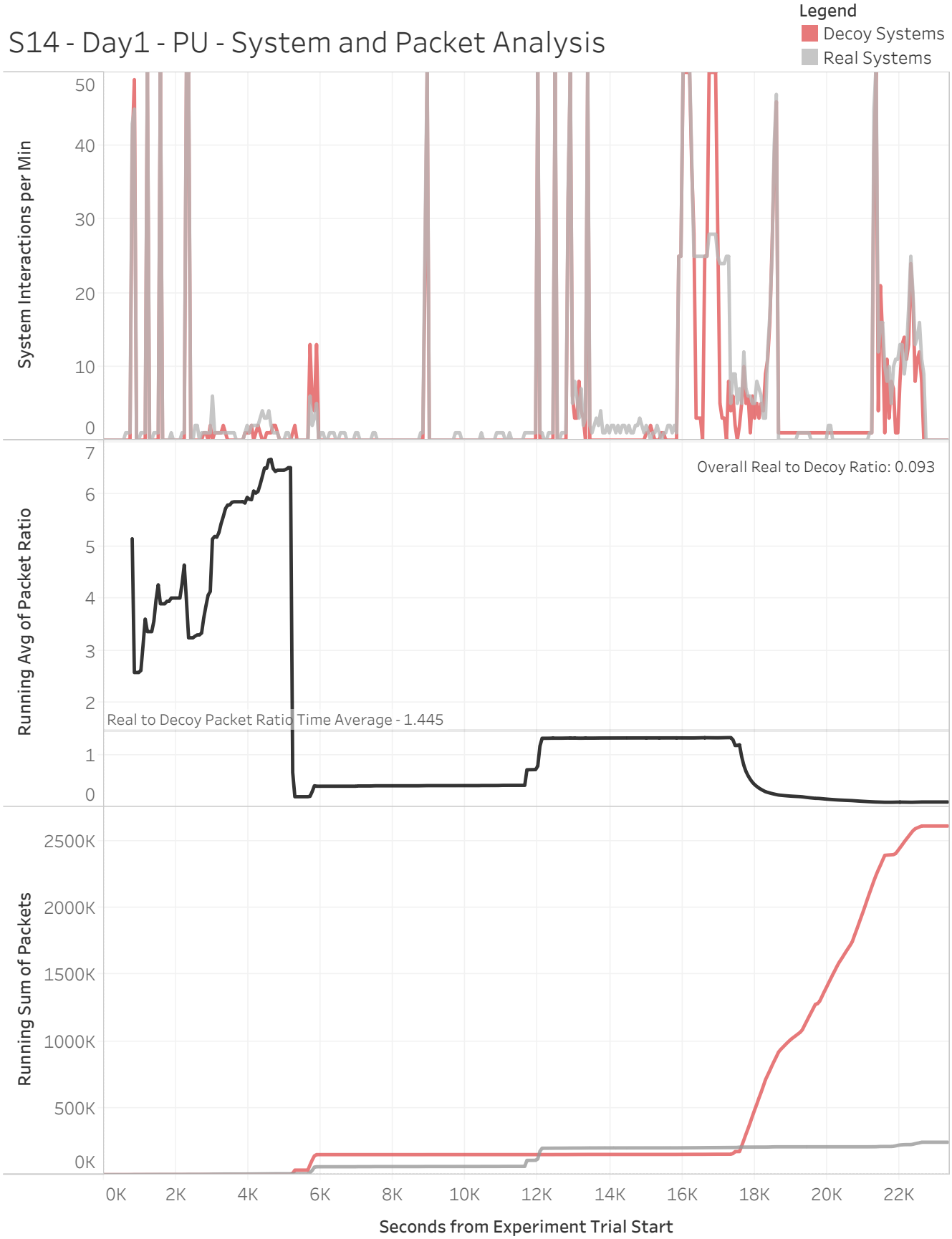


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

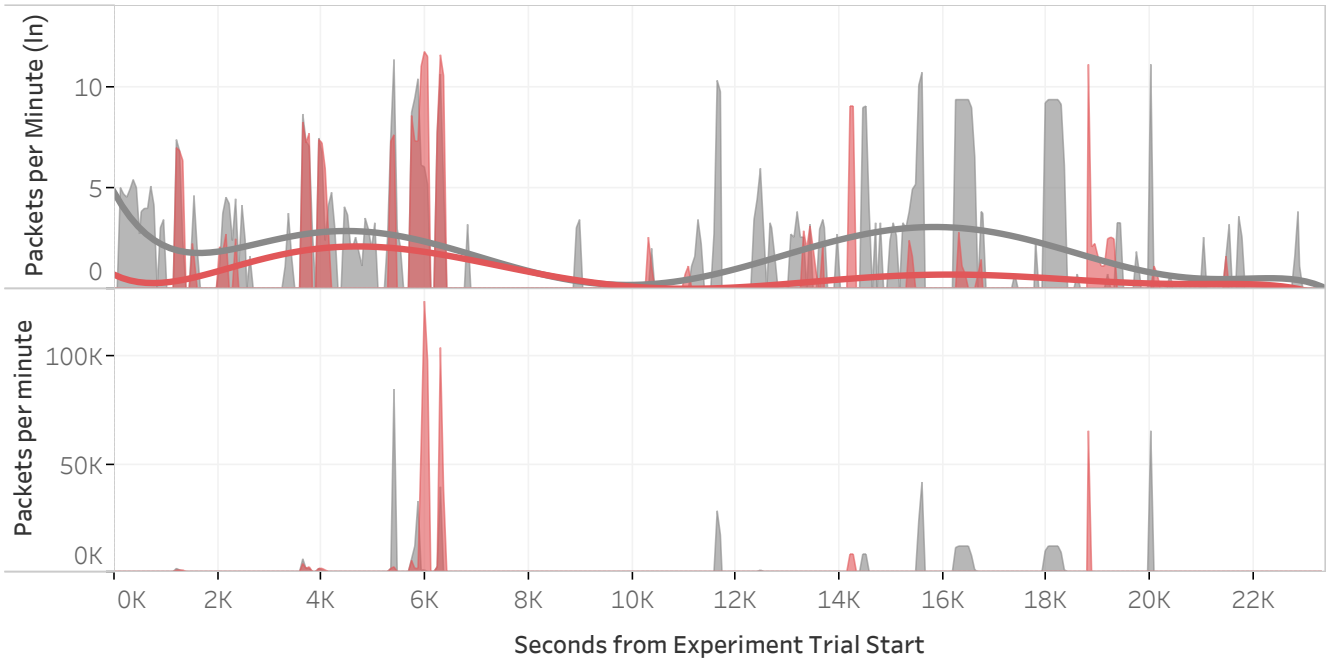



S14 - Day1 - PU - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
7
6
5
4
3
2
1
0
Overall Real to Decoy Ratio: 0.093
Real to Decoy Packet Ratio Time Average - 1.445
Running Sum of Packets
2500K
2000K
1500K
1000K
500K
0K
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

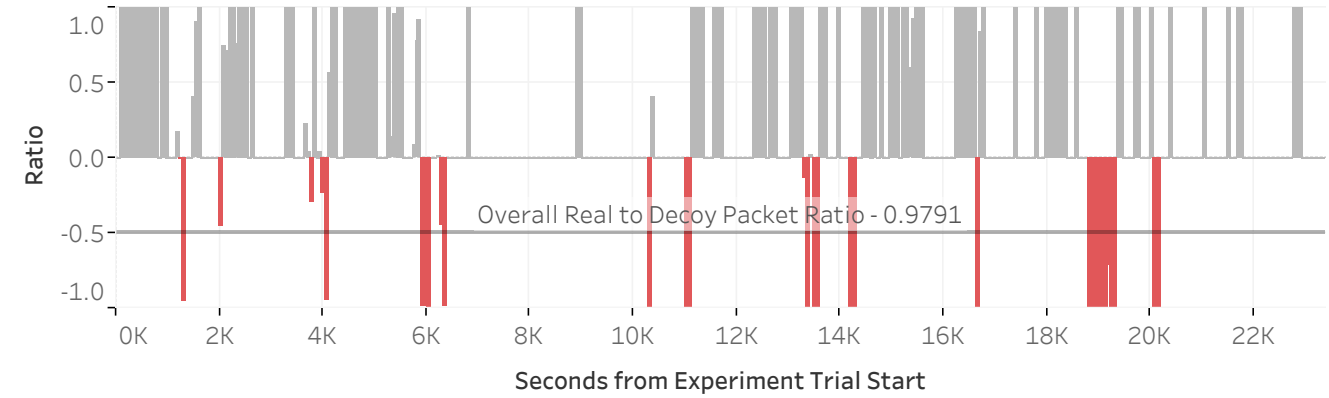
S16 - Day1 - PU

Legend
Real Systems
Decoy Systems

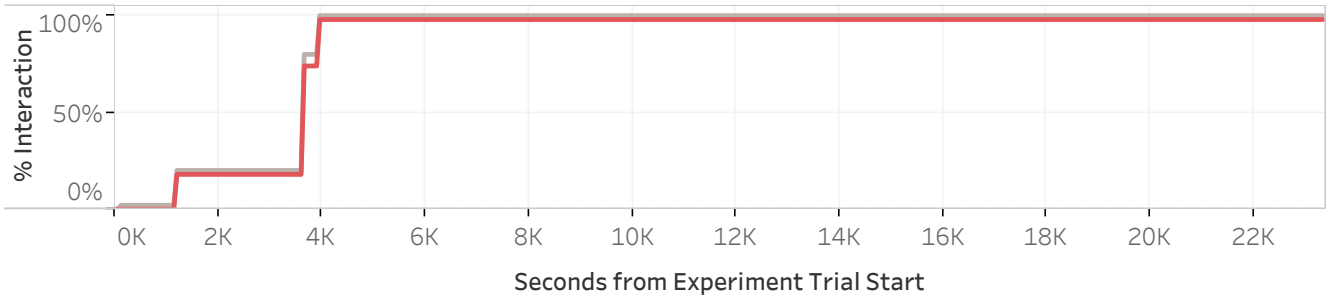
Real & Decoy Packets per Minute

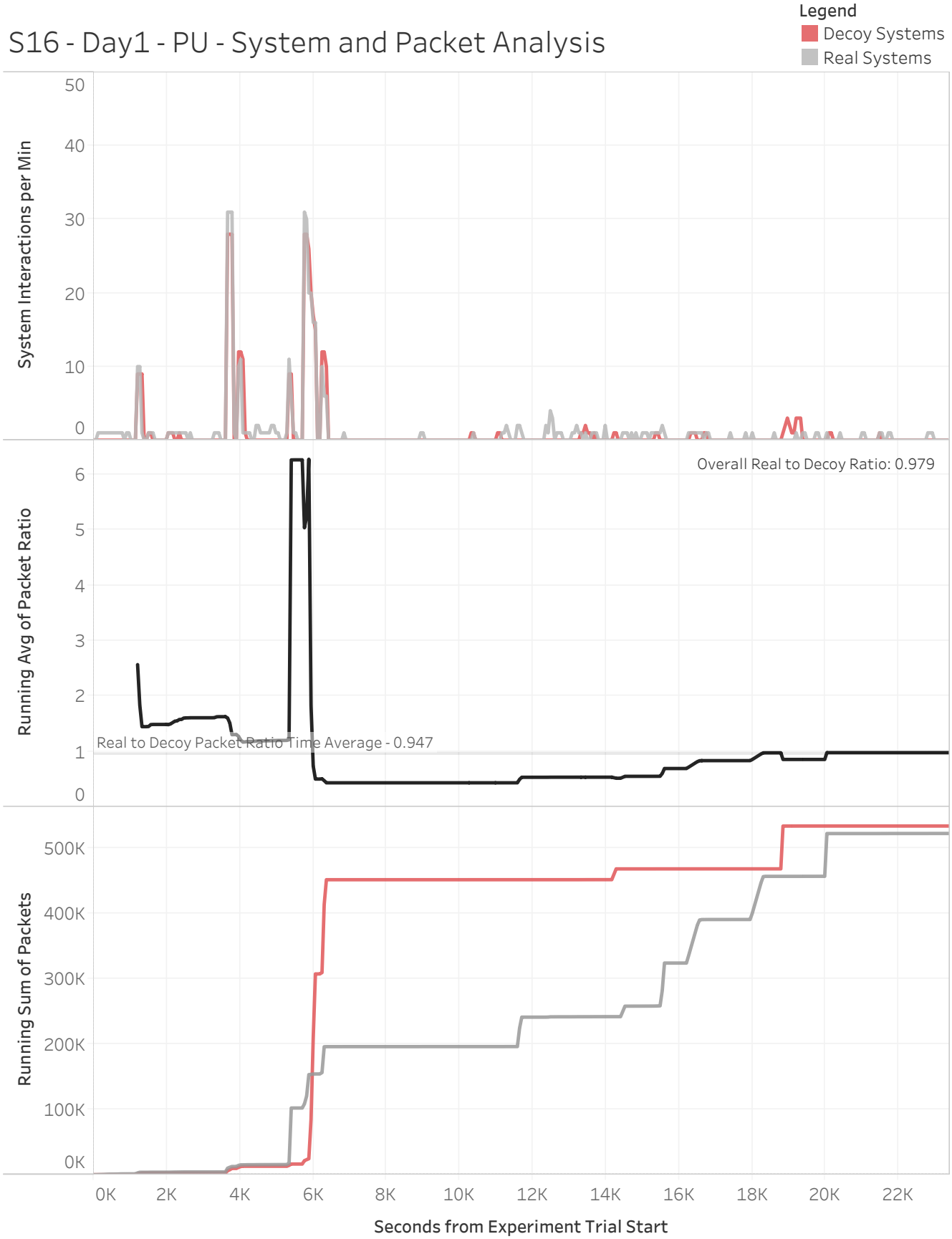


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

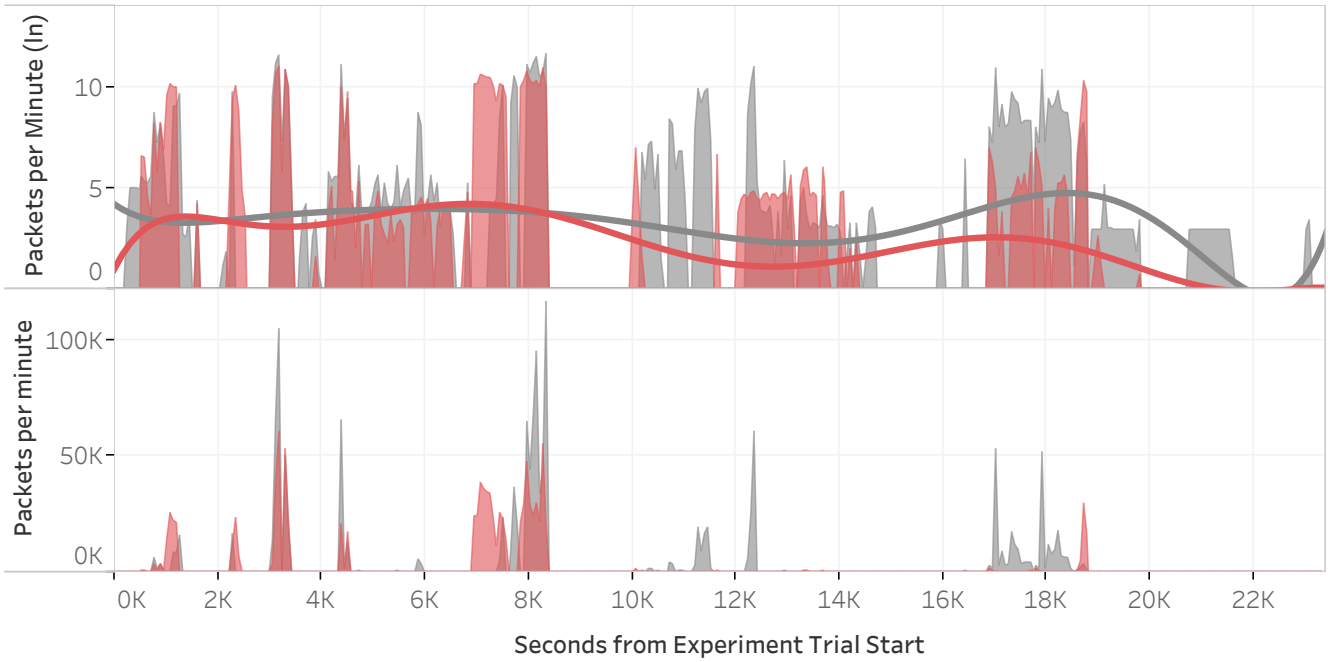



S16 - Day1 - PU - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
6
5
4
3
2
1
0
Overall Real to Decoy Ratio: 0.979
Real to Decoy Packet Ratio Time Average - 0.947
Running Sum of Packets
500K
400K
300K
200K
100K
0K
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

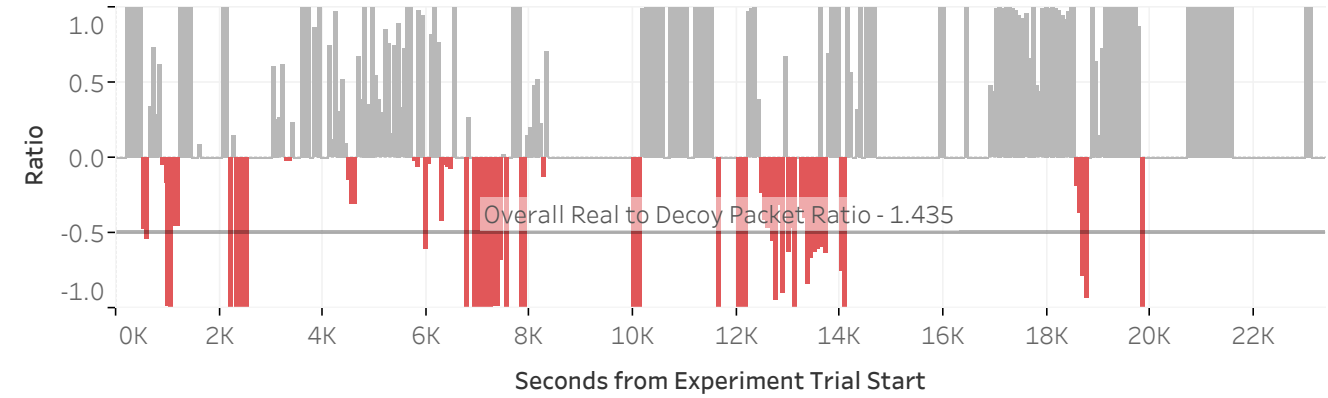
S17 - Day1 - PU

Legend
Real Systems
Decoy Systems

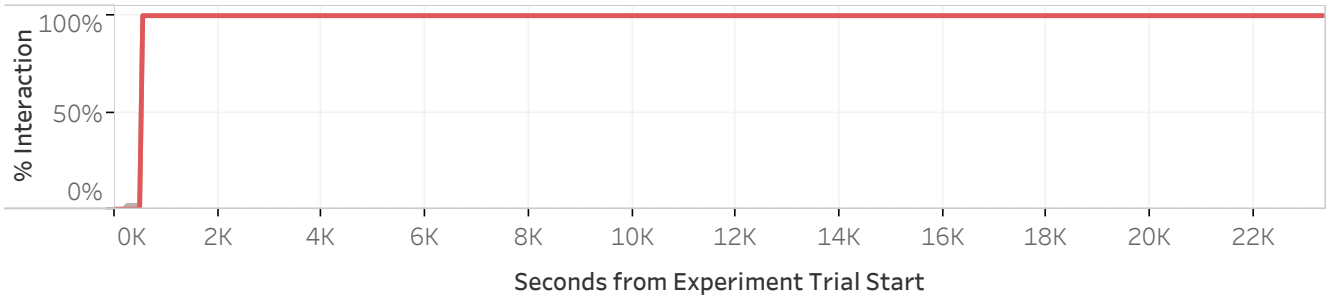
Real & Decoy Packets per Minute

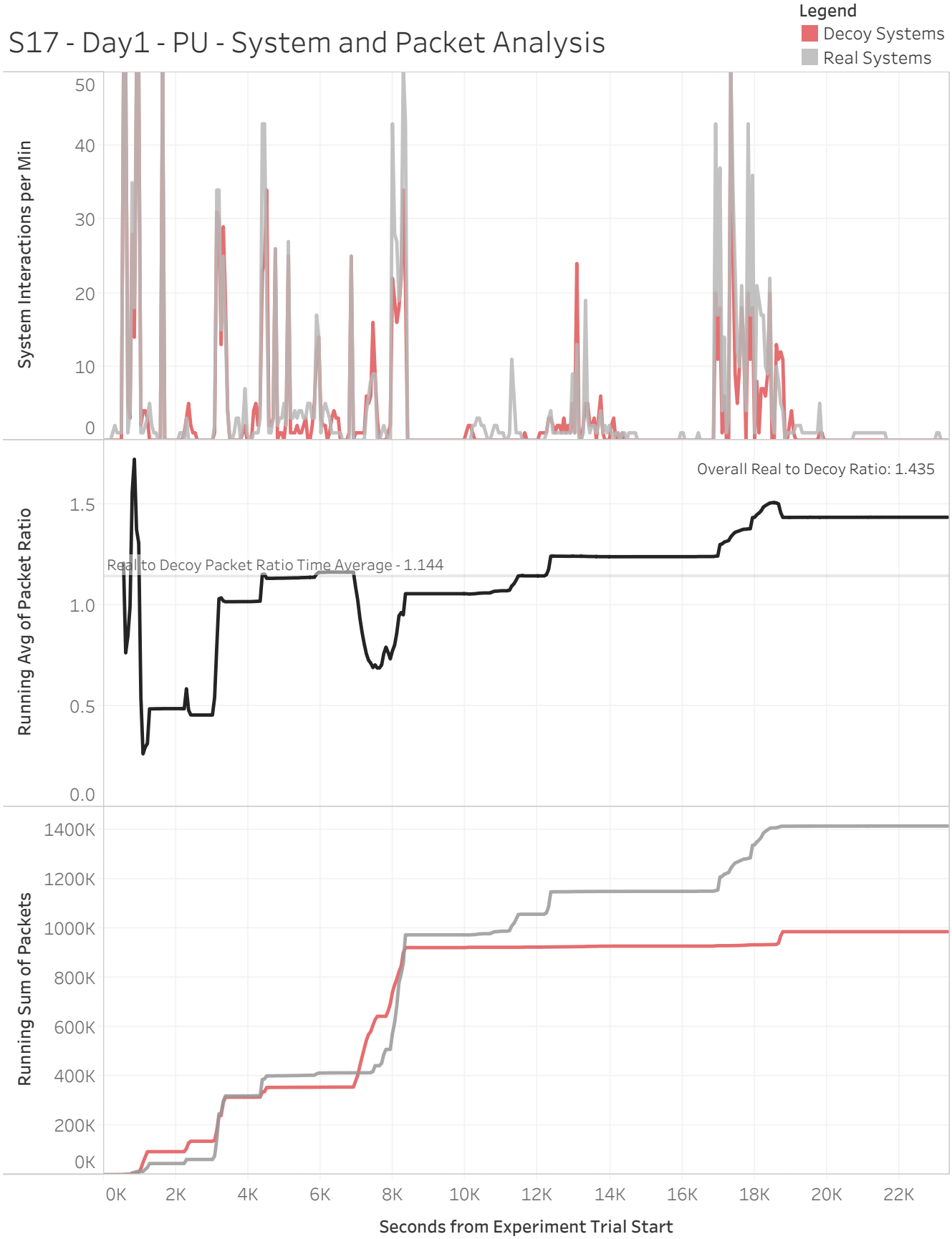


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

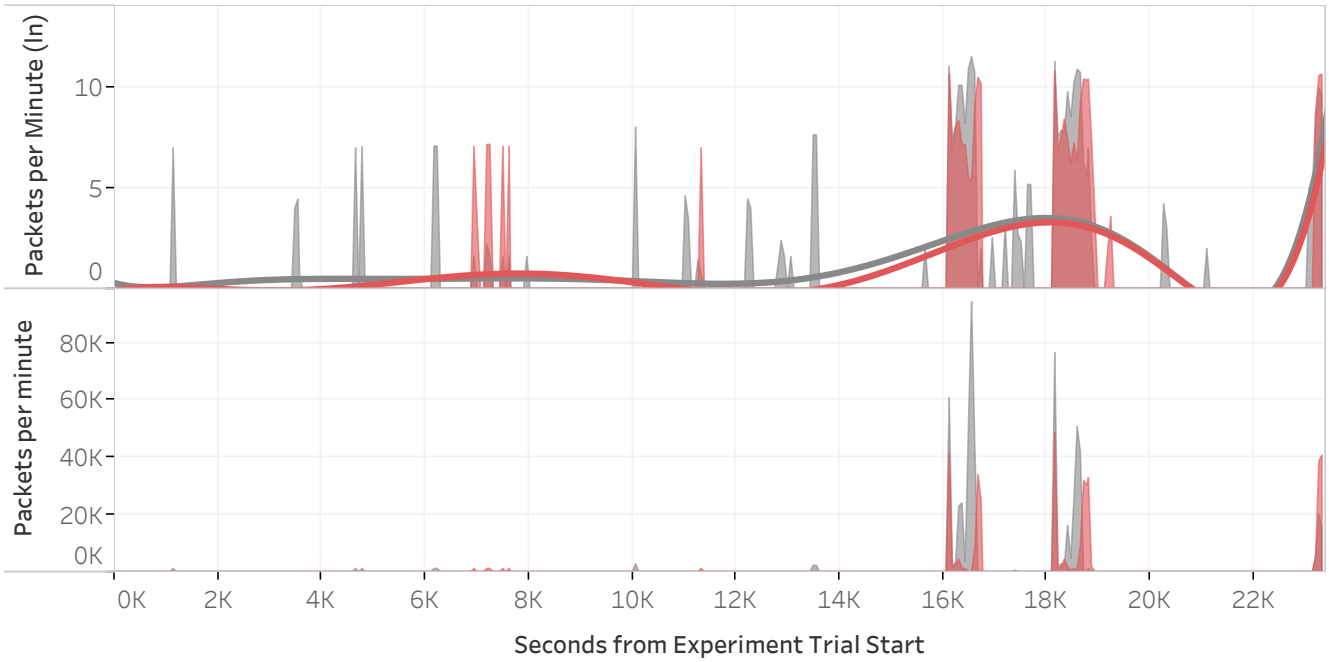



S17 - Day1 - PU - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
1.5
1.0
0.5
0.0
Overall Real to Decoy Ratio: 1.435
Real to Decoy Packet Ratio Time Average - 1.144
Running Sum of Packets
1400K
1200K
1000K
800K
600K
400K
200K
0K
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

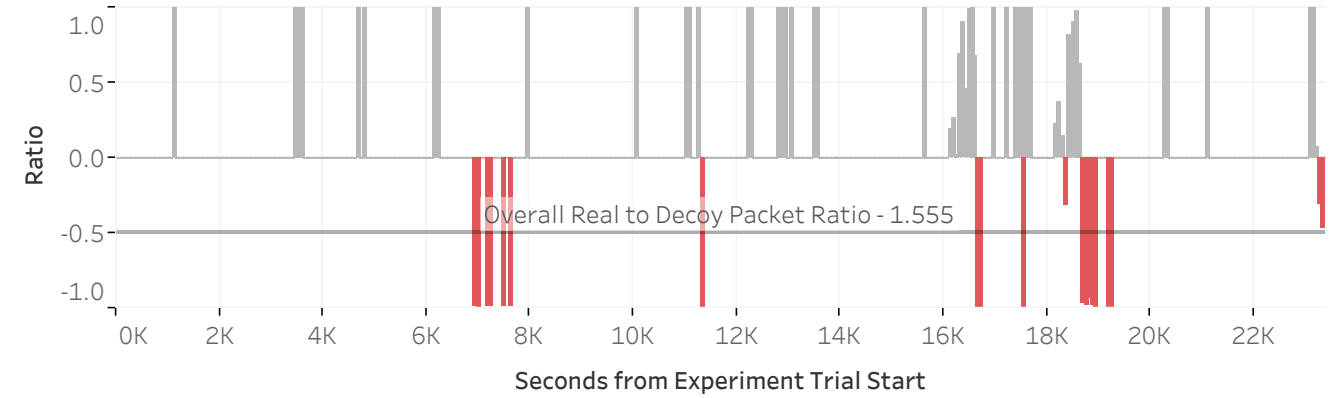
S18 - Day1 - PU

Legend
Real Systems
Decoy Systems

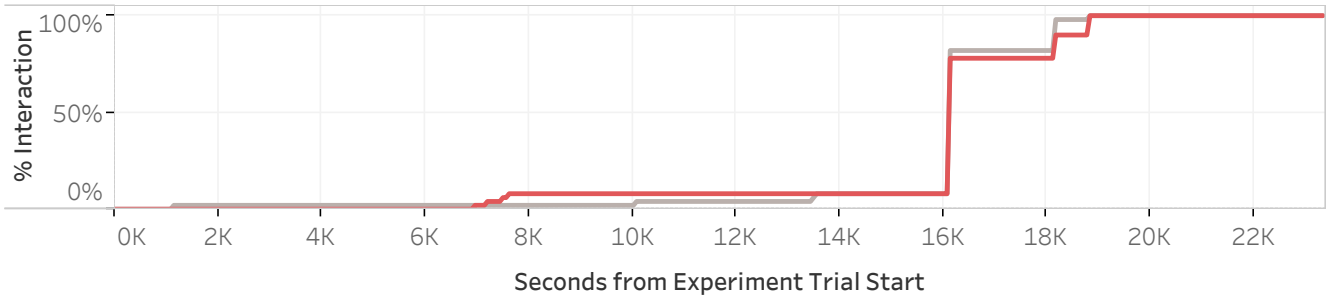
Real & Decoy Packets per Minute

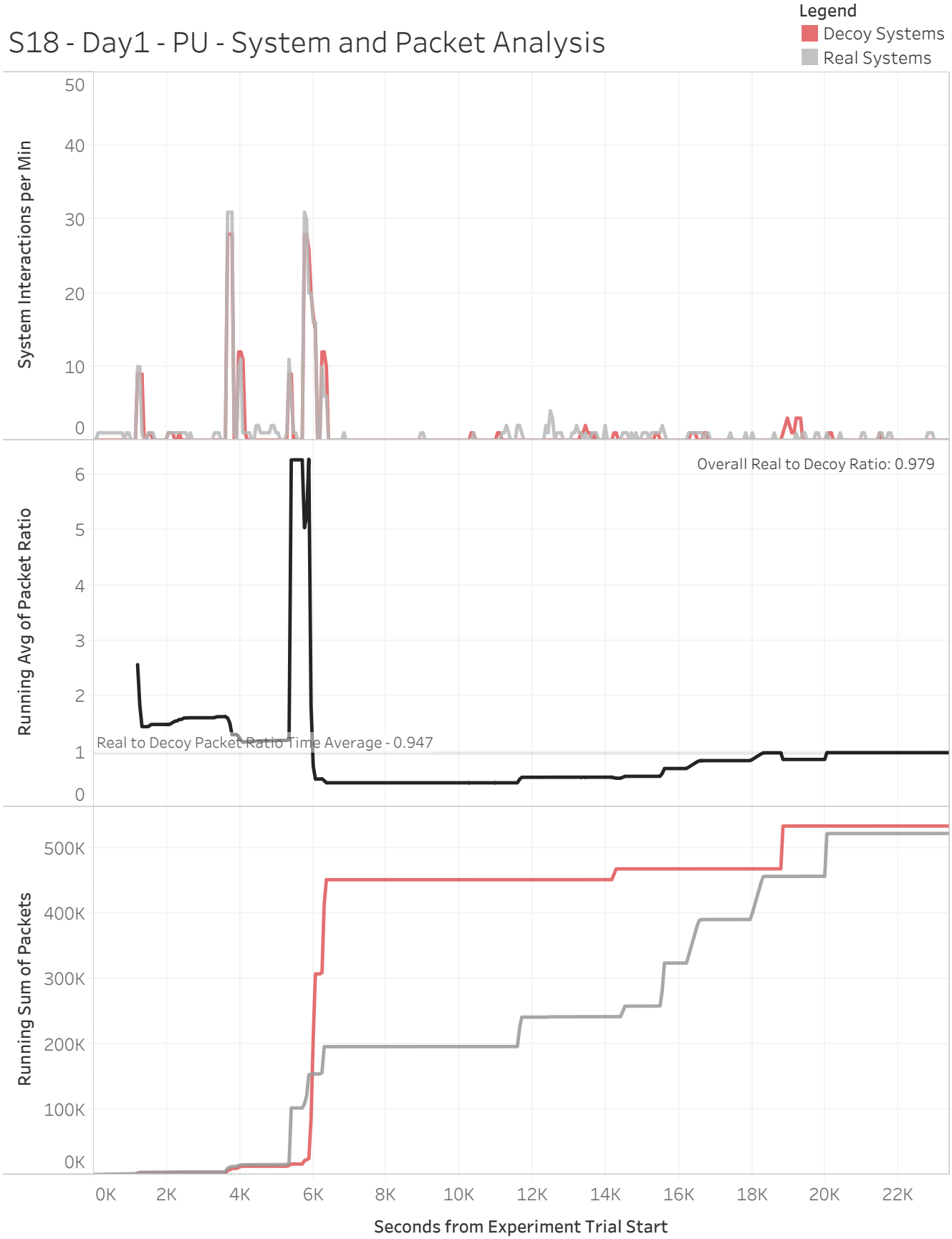


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

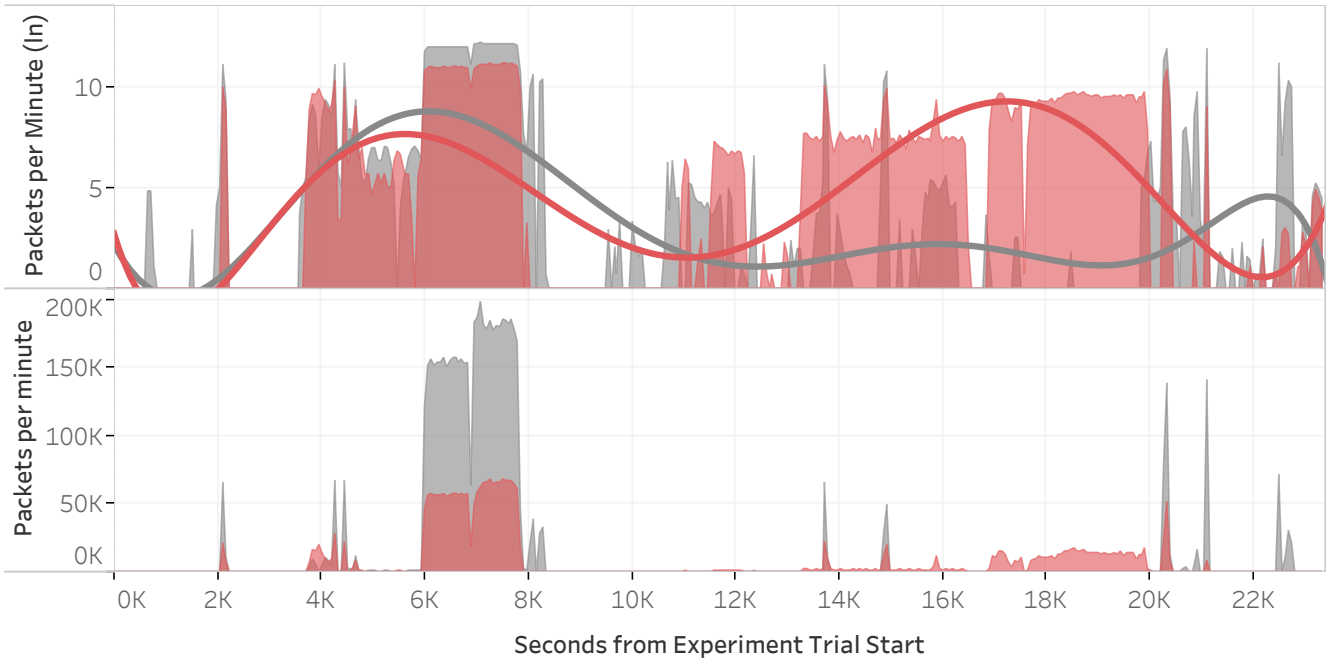



S18 - Day1 - PU - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
6
5
4
3
2
1
0
Overall Real to Decoy Ratio: 0.979
Real to Decoy Packet Ratio Time Average - 0.947
Running Sum of Packets
500K
400K
300K
200K
100K
0K
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

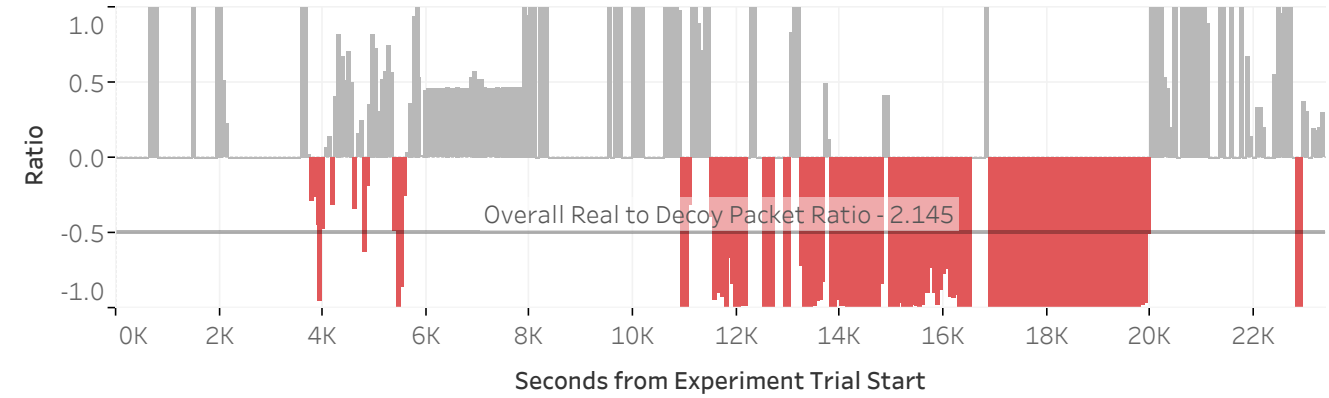
S19 - Day1 - PU

Legend
Real Systems
Decoy Systems

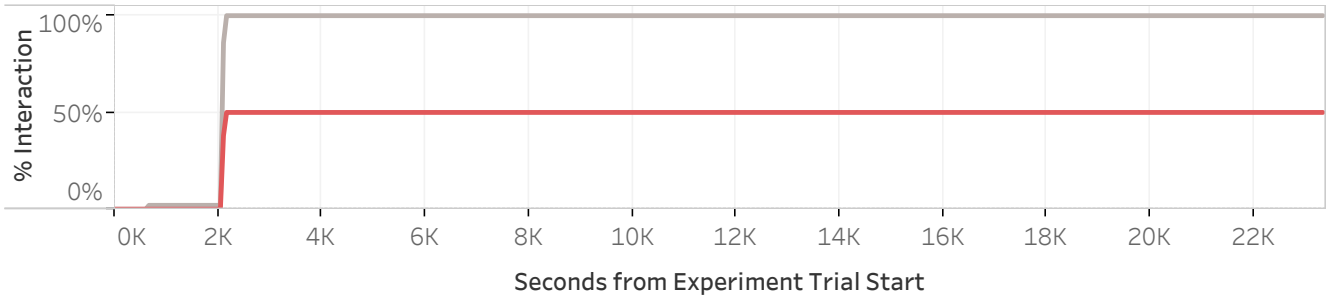
Real & Decoy Packets per Minute

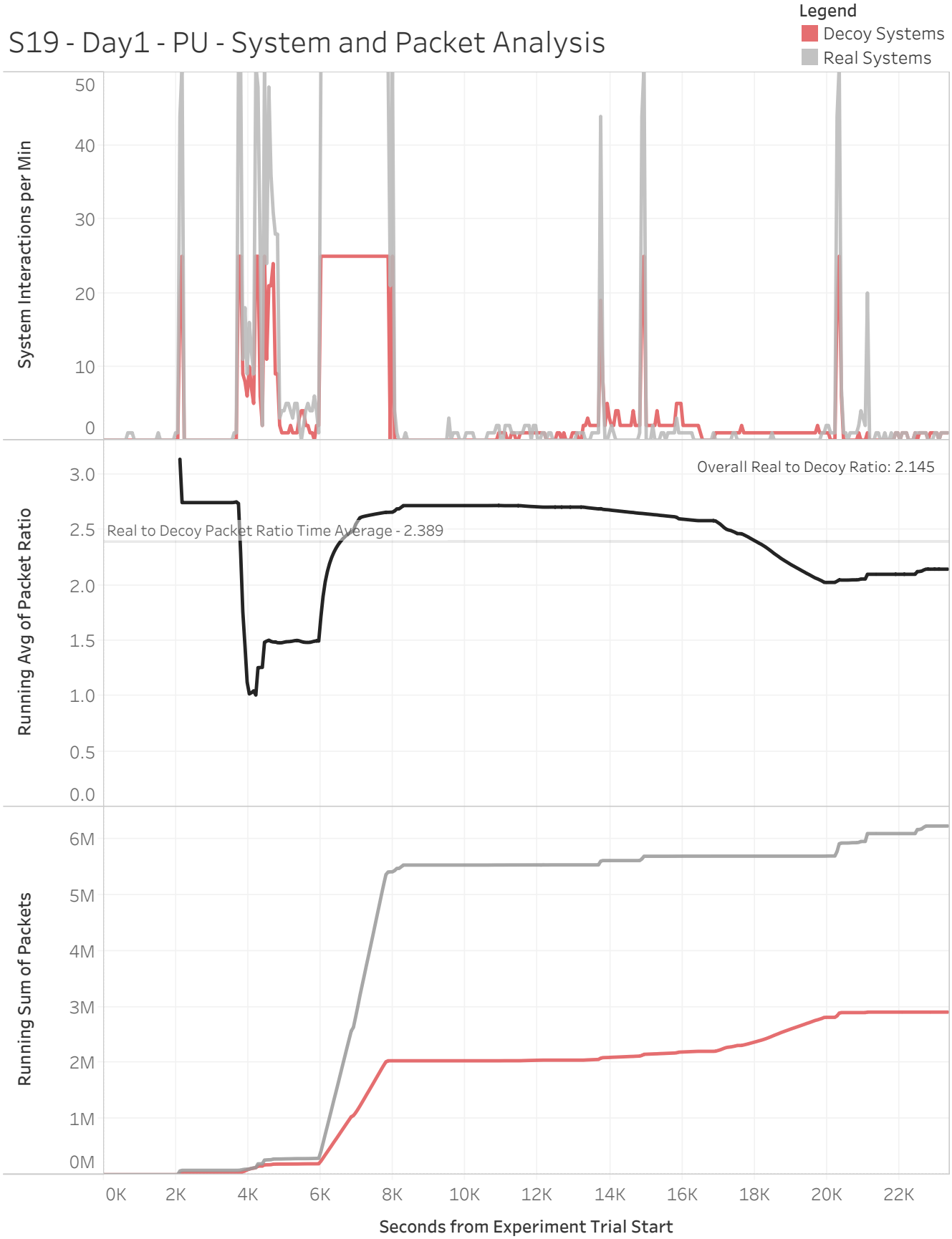


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

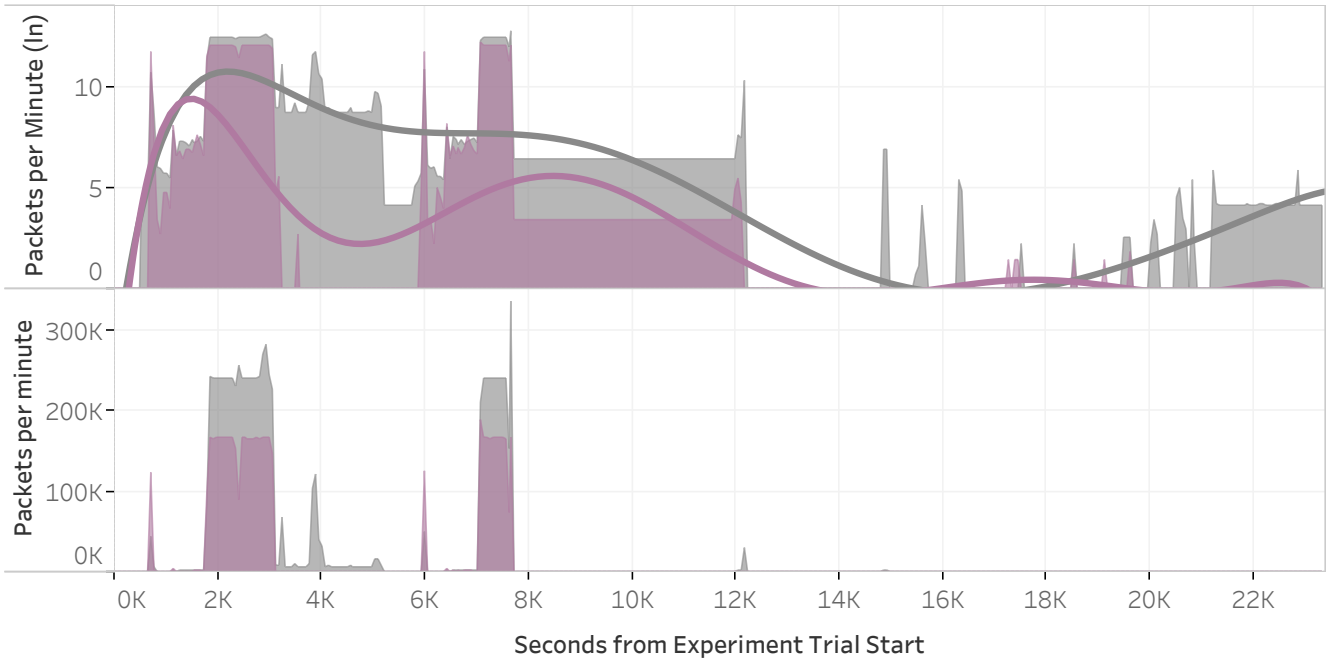



S19 - Day1 - PU - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Overall Real to Decoy Ratio: 2.145
Real to Decoy Packet Ratio Time Average - 2.389
Running Sum of Packets
6M
5M
4M
3M
2M
1M
0M
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

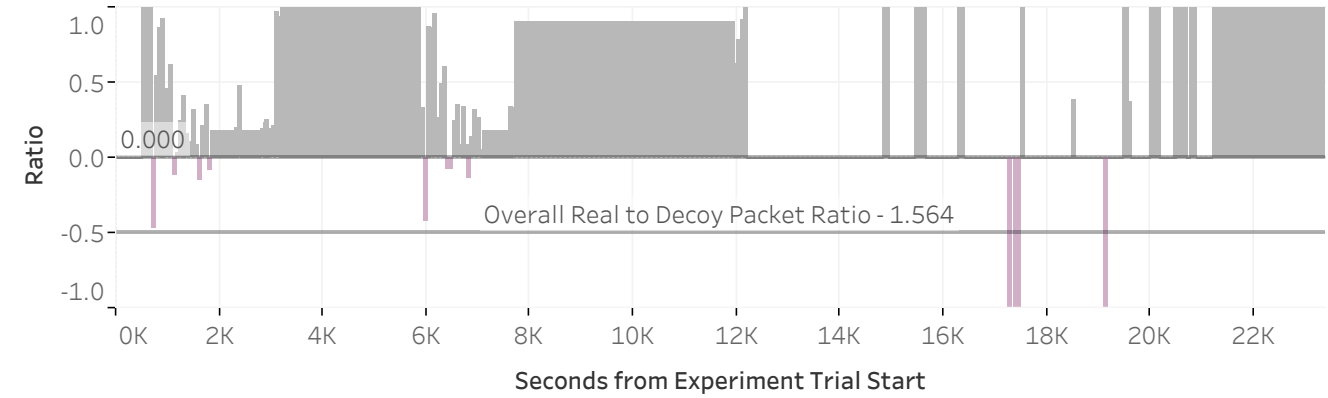
S20 - Day1 - PI

Legend
Real Systems
Decoy Systems

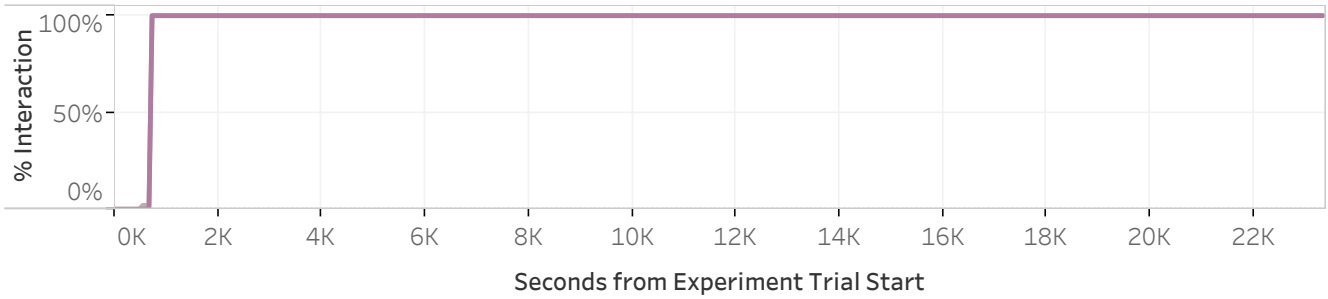
Real & Decoy Packets per Minute

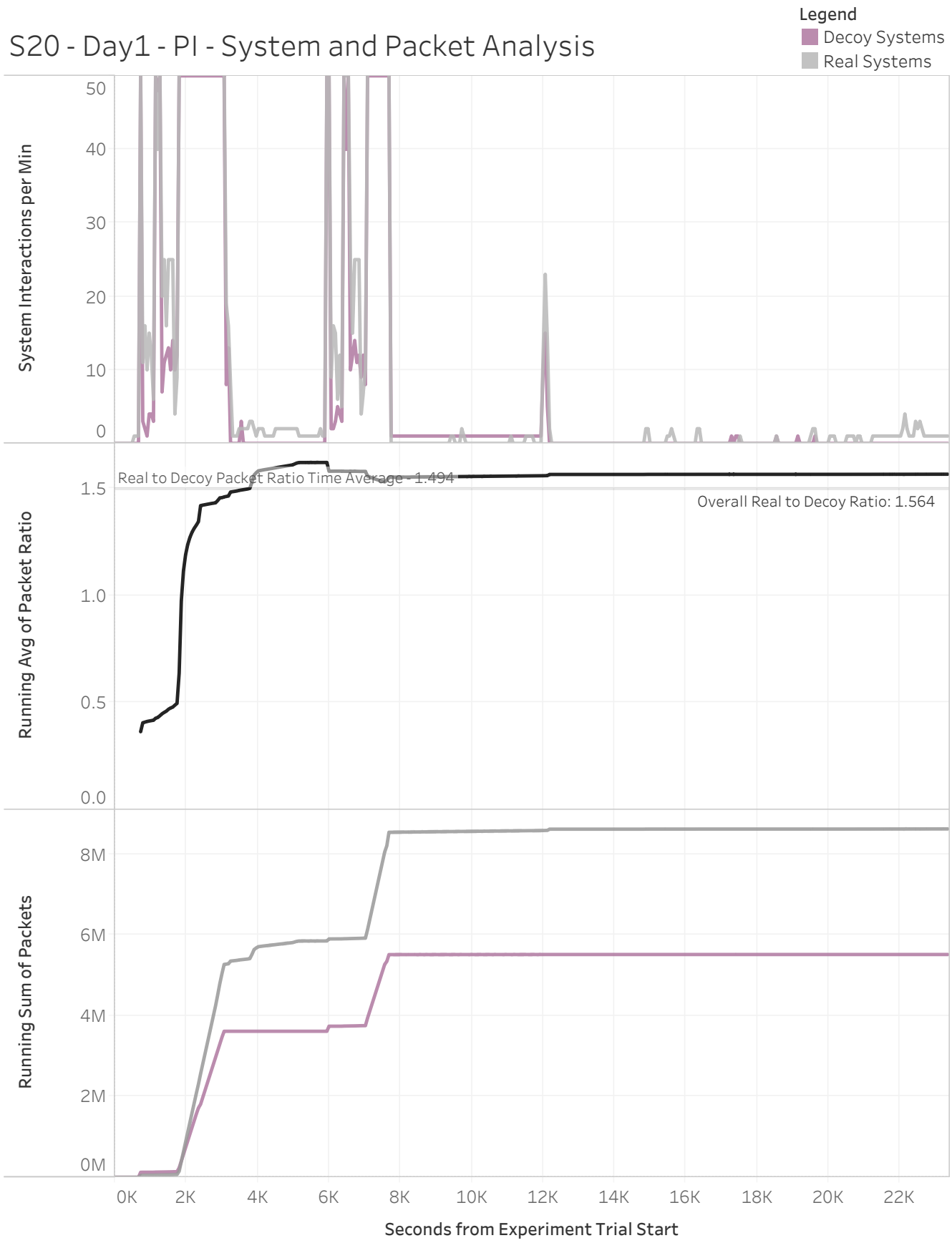


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

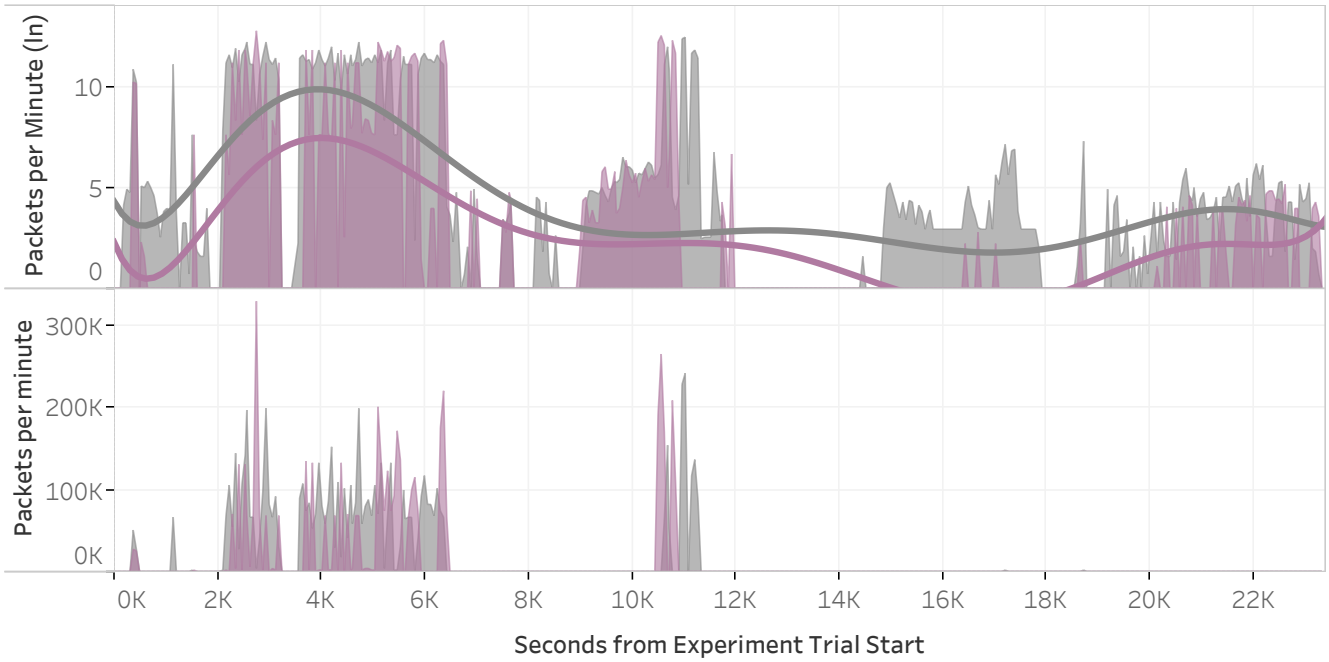



S20 - Day1 - PI - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
Real to Decoy Packet Ratio Time Average - 1.494
Overall Real to Decoy Ratio: 1.564
1.5
1.0
0.5
0.0
Running Sum of Packets
8M
6M
4M
2M
0M
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

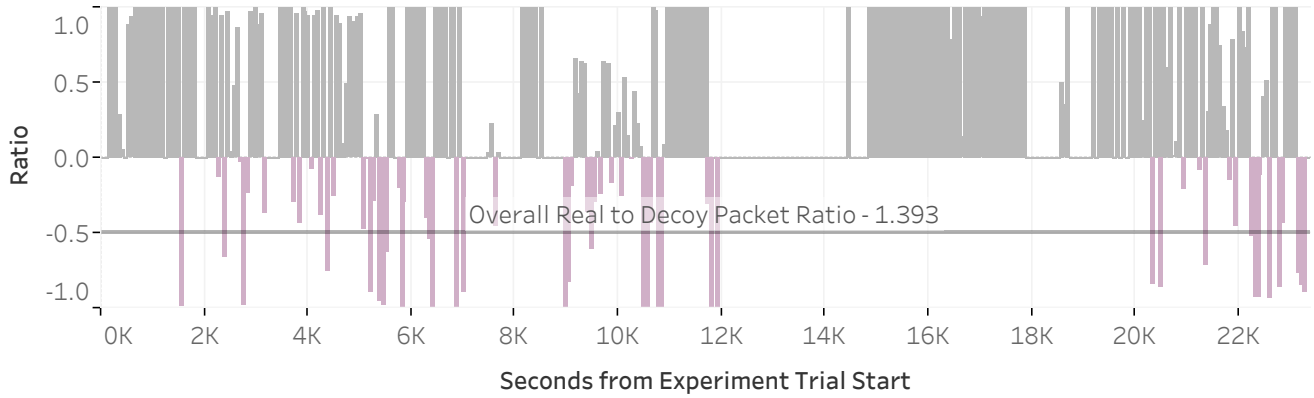
S21 - Day1 - PI

Legend
Real Systems
Decoy Systems

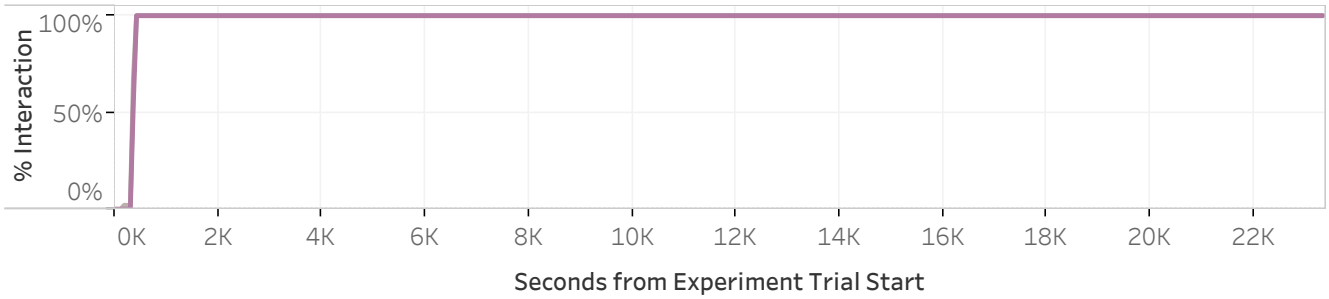
Real & Decoy Packets per Minute

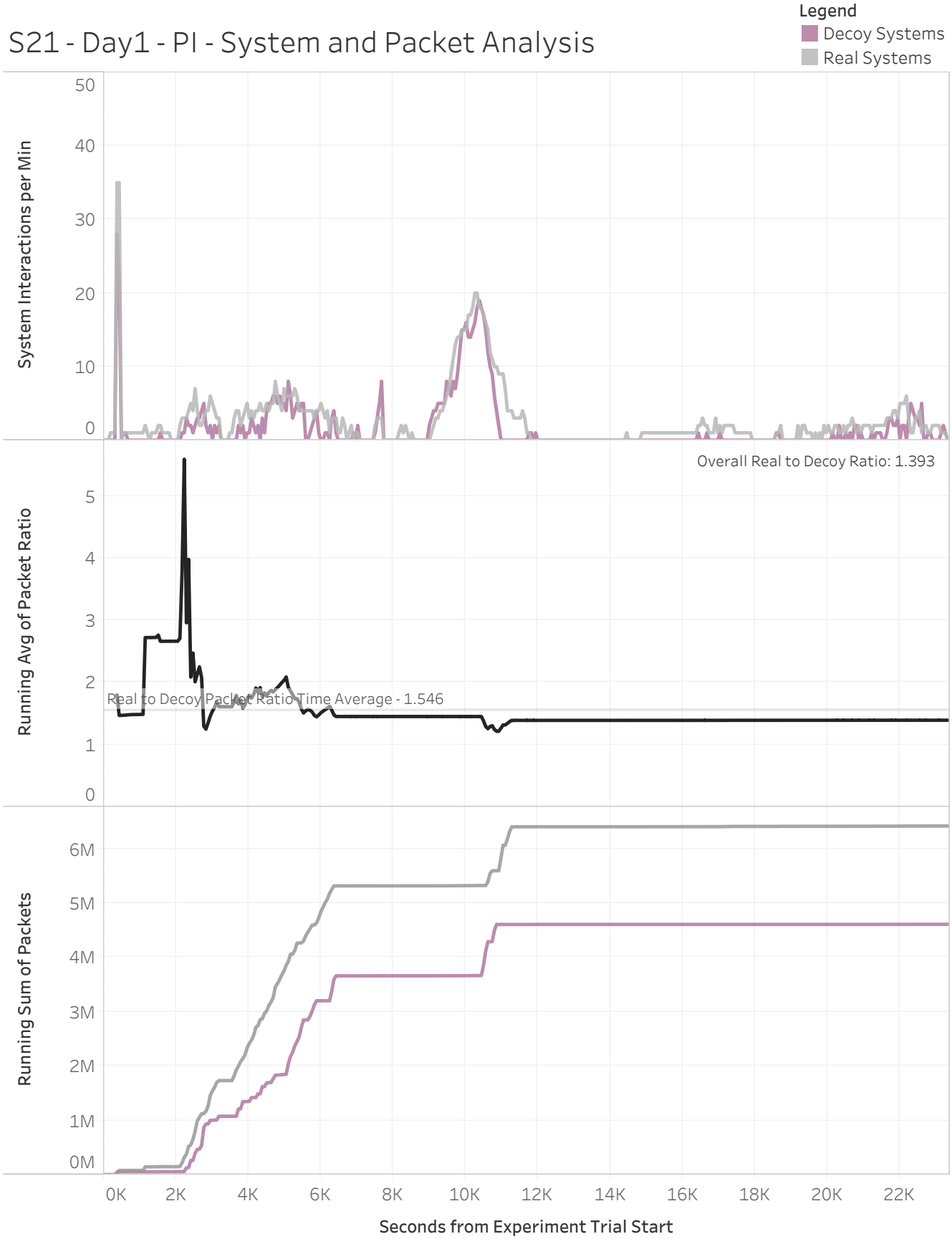


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

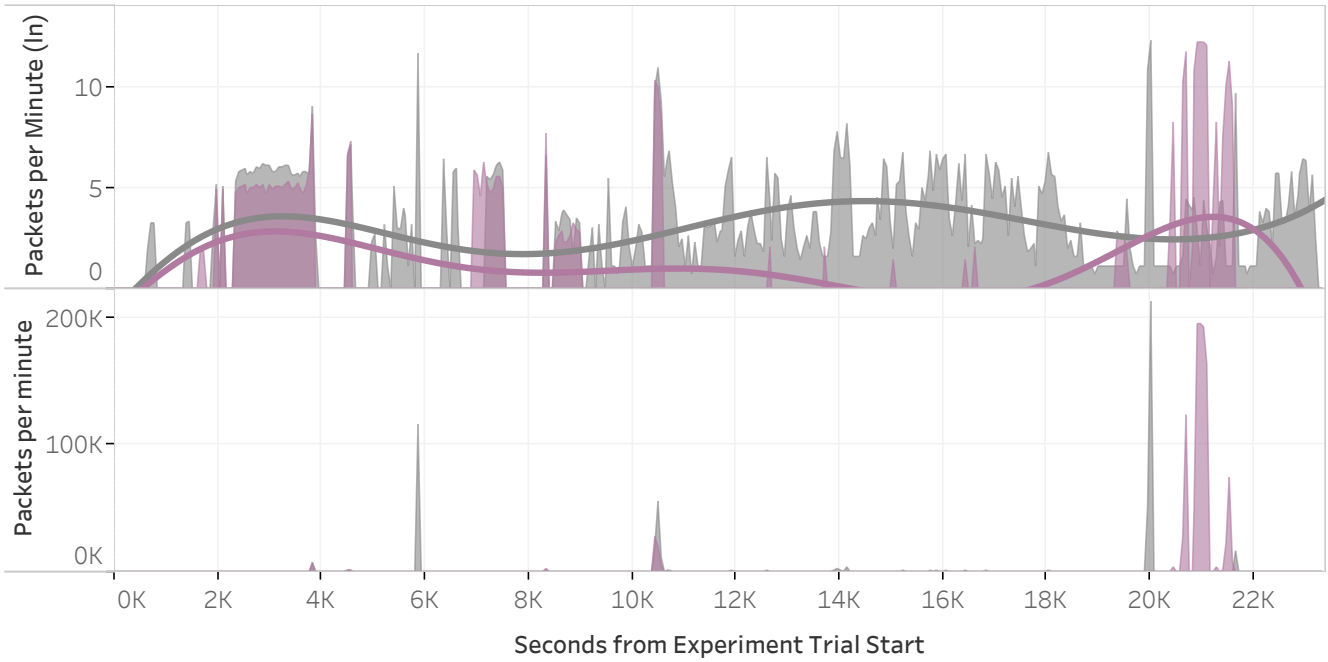



S21 - Day1 - PI - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
Overall Real to Decoy Ratio: 1.393
Real to Decoy Packet Ratio Time Average - 1.546
5
4
3
2
1
0
Running Sum of Packets
6M
5M
4M
3M
2M
1M
0M
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

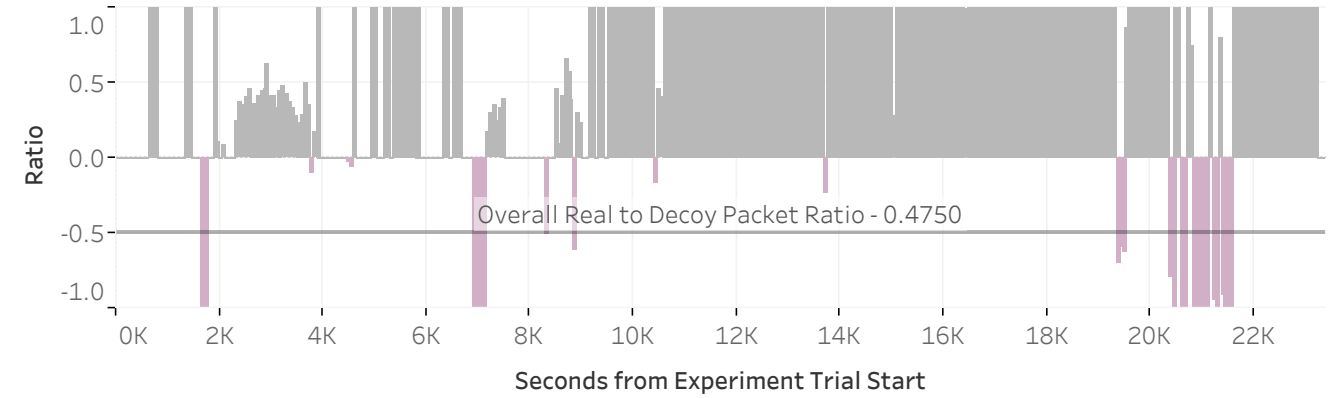
S22 - Day1 - PI

Legend
Real Systems
Decoy Systems

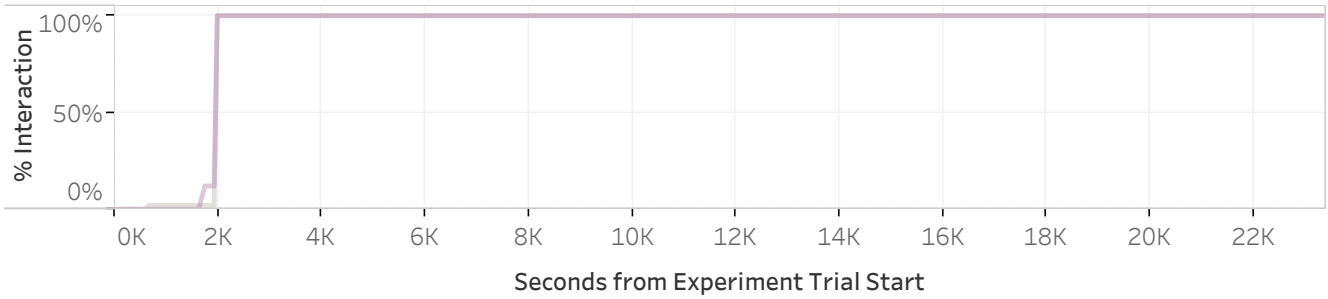
Real & Decoy Packets per Minute

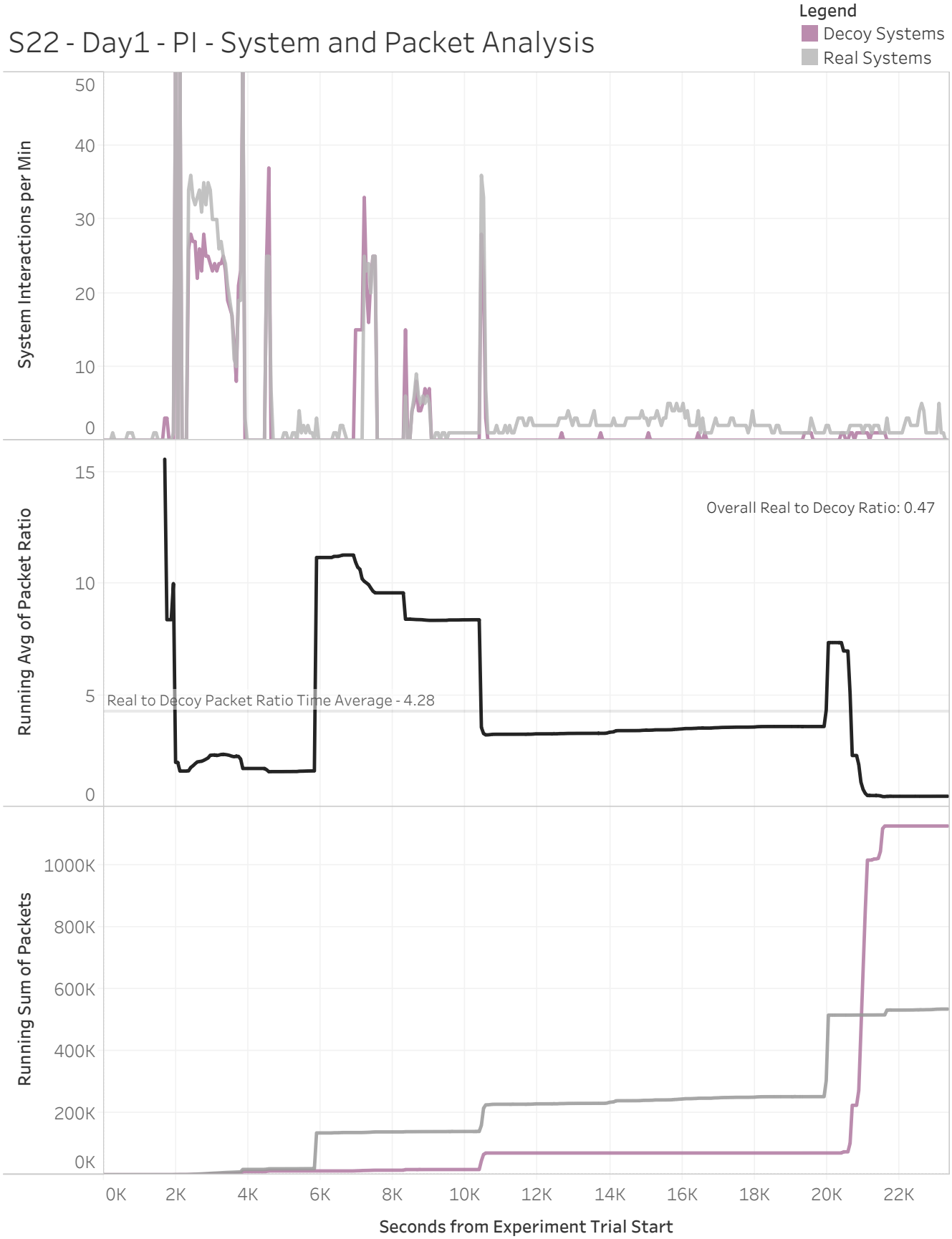


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

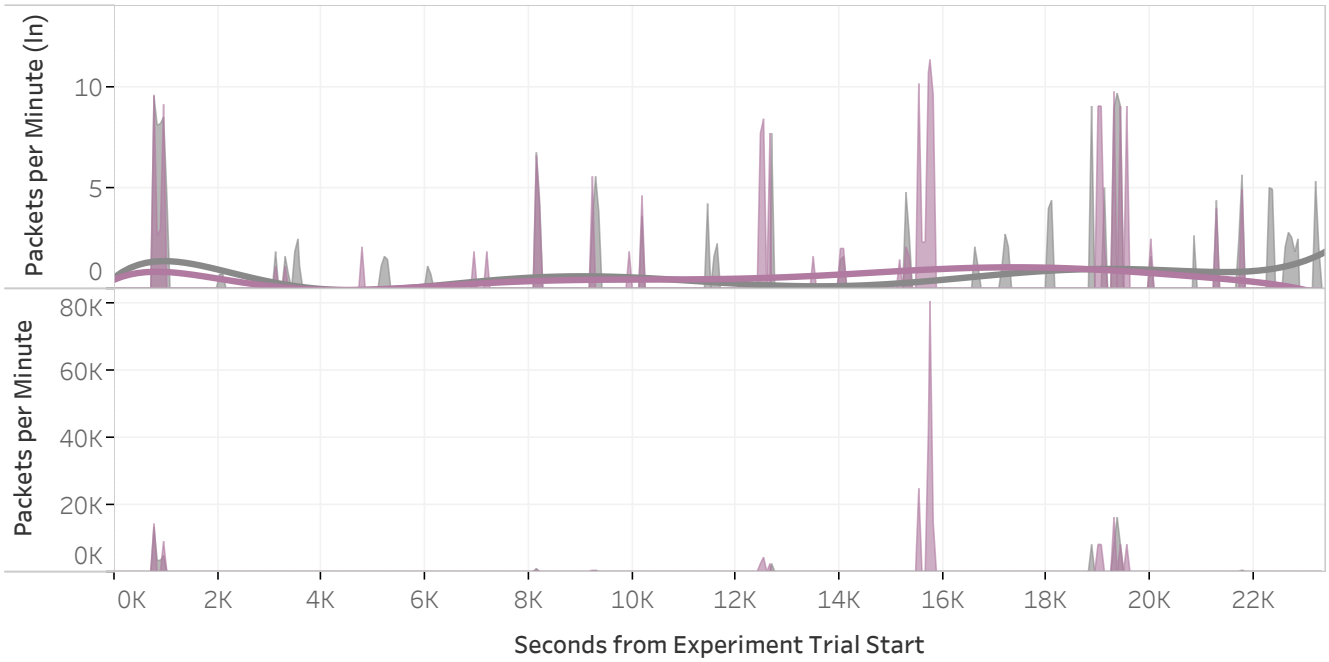



S22 - Day1 - PI - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
15
10
5
0
Overall Real to Decoy Ratio: 0.47
Real to Decoy Packet Ratio Time Average - 4.28
Running Sum of Packets
1000K
800K
600K
400K
200K
0K
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

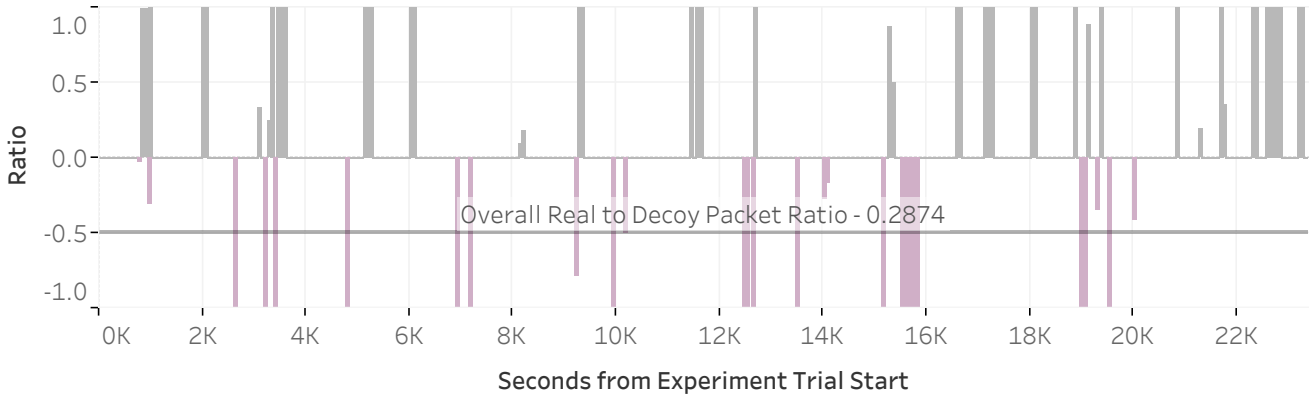
S23 - Day1 - PI

Legend
Real Systems
Decoy Systems

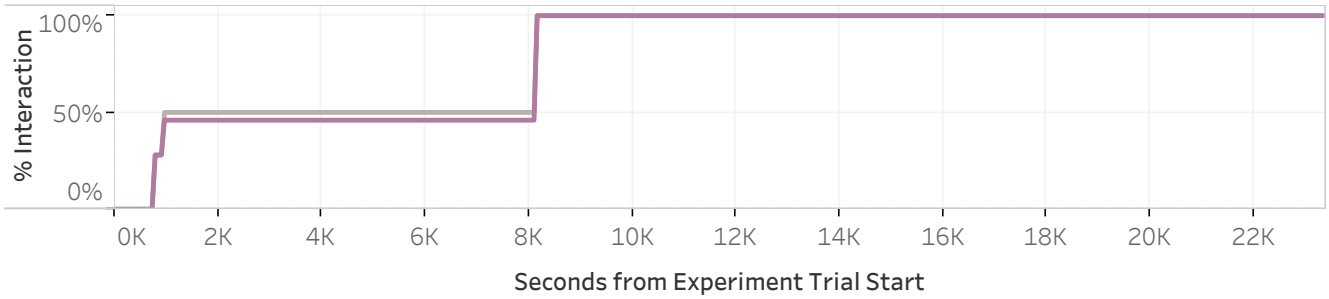
Real & Decoy Packets per Minute

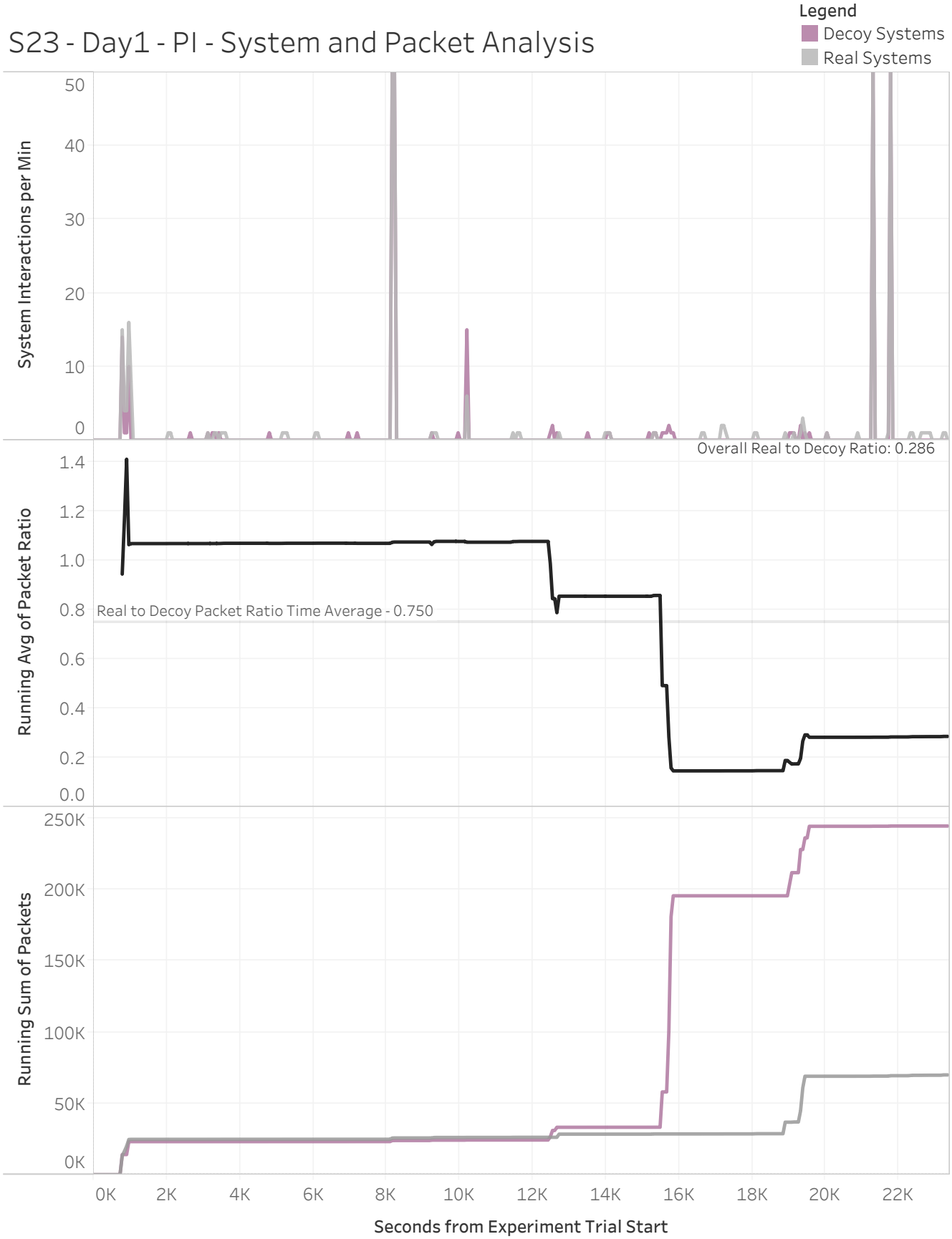


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

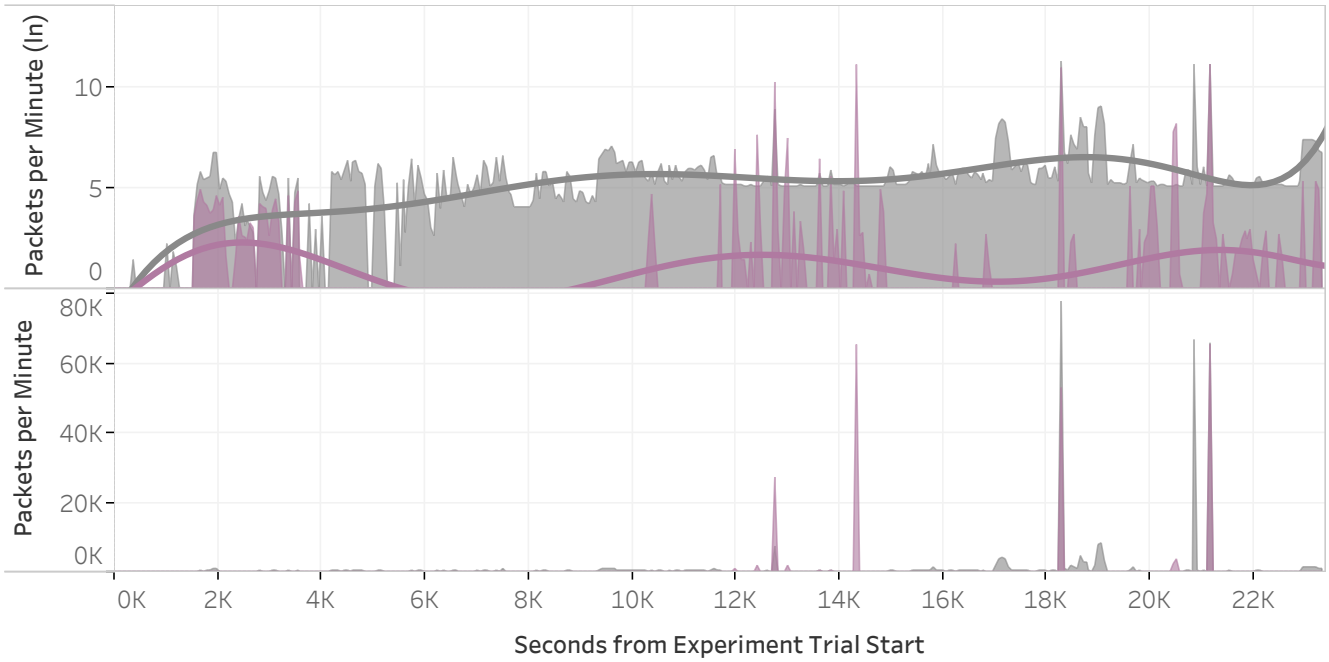



S23 - Day1 - PI - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Overall Real to Decoy Ratio: 0.286
Running Avg of Packet Ratio
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
Real to Decoy Packet Ratio Time Average - 0.750
Running Sum of Packets
250K
200K
150K
100K
50K
0K
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

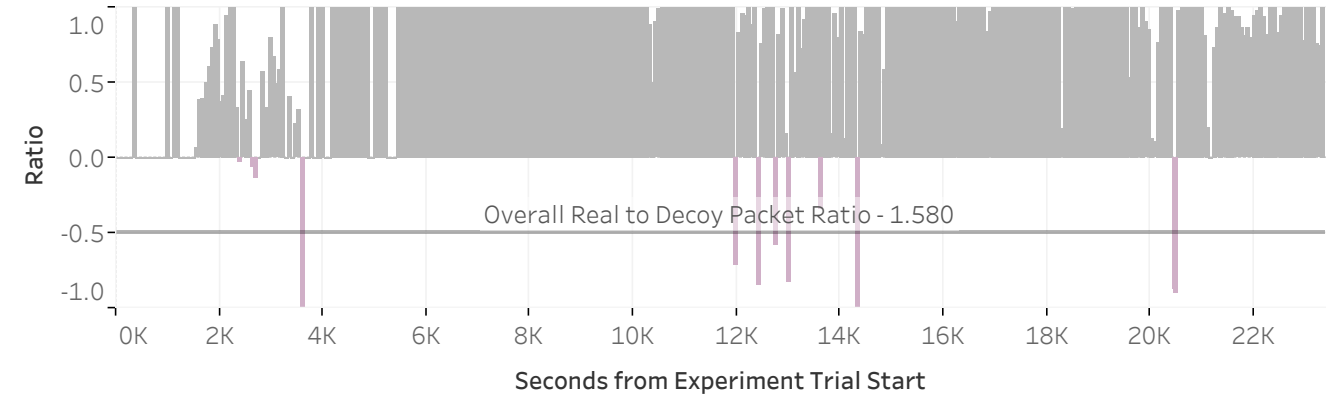
S24 - Day1 - PI

Legend
Real Systems
Decoy Systems

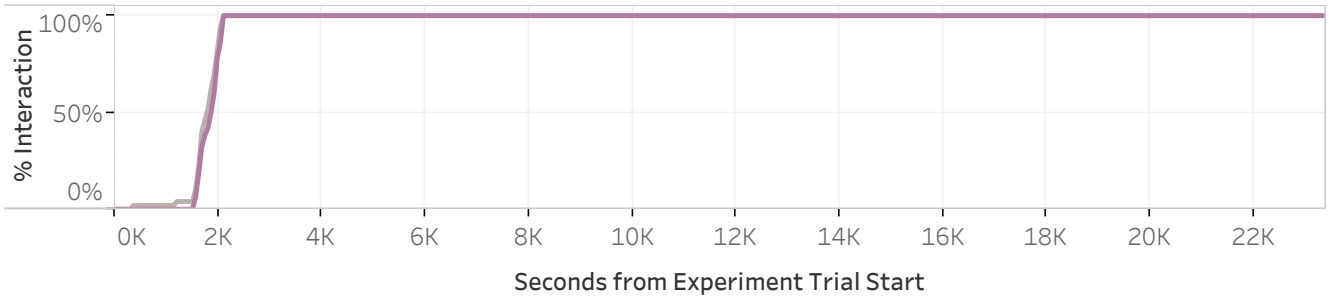
Real & Decoy Packets per Minute

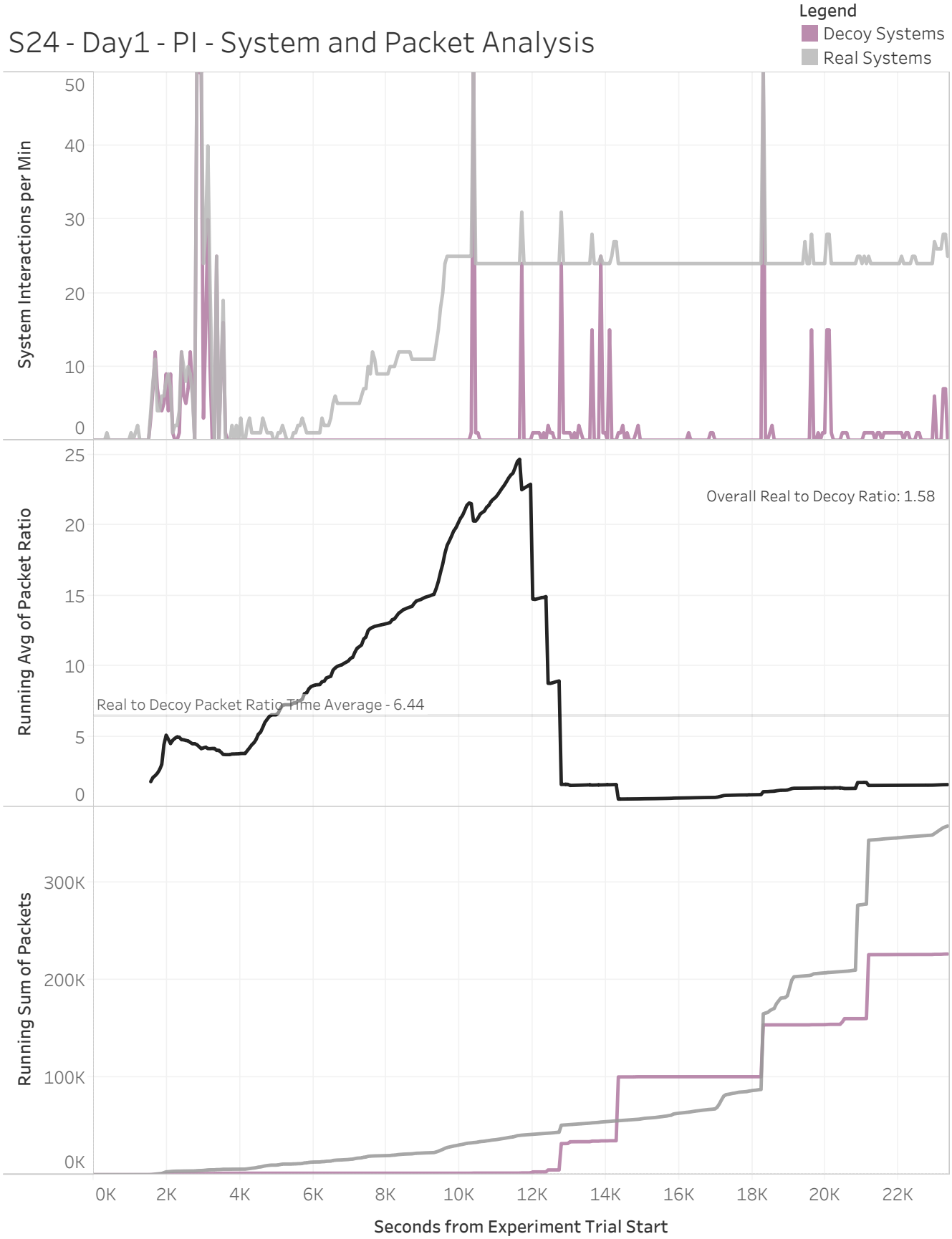


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

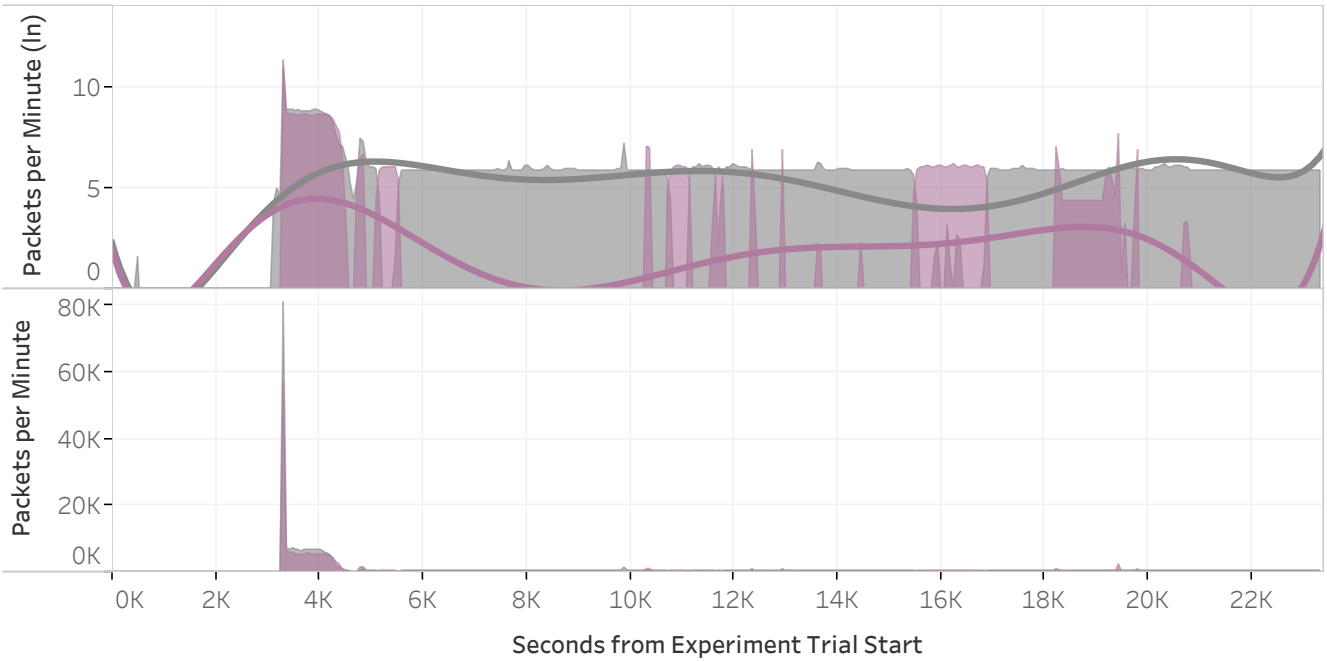



S24 - Day1 - PI - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
25
20
15
10
5
0
Overall Real to Decoy Ratio: 1.58
Real to Decoy Packet Ratio Time Average - 6.44
Running Sum of Packets
300K
200K
100K
0K
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

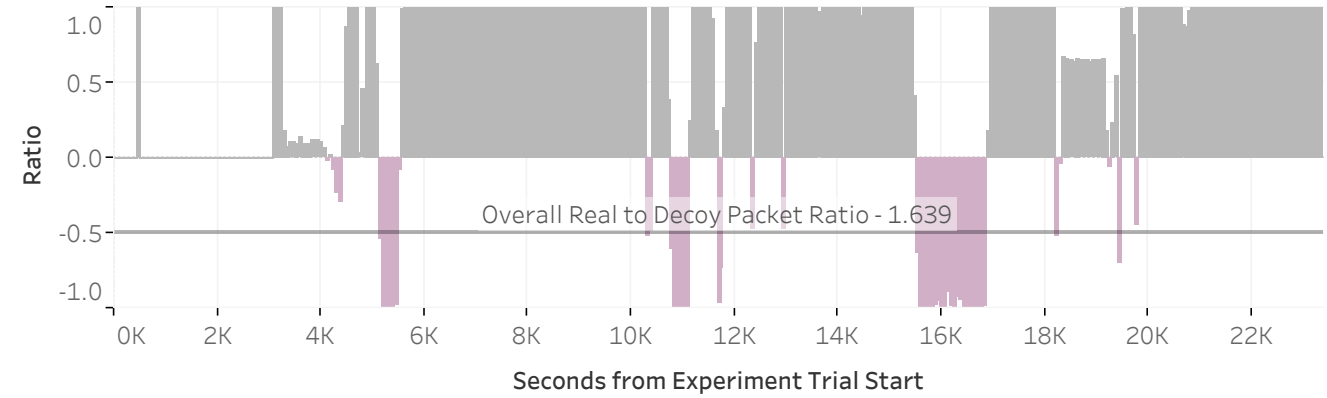
S25 - Day1 - PI

Legend
Real Systems
Decoy Systems

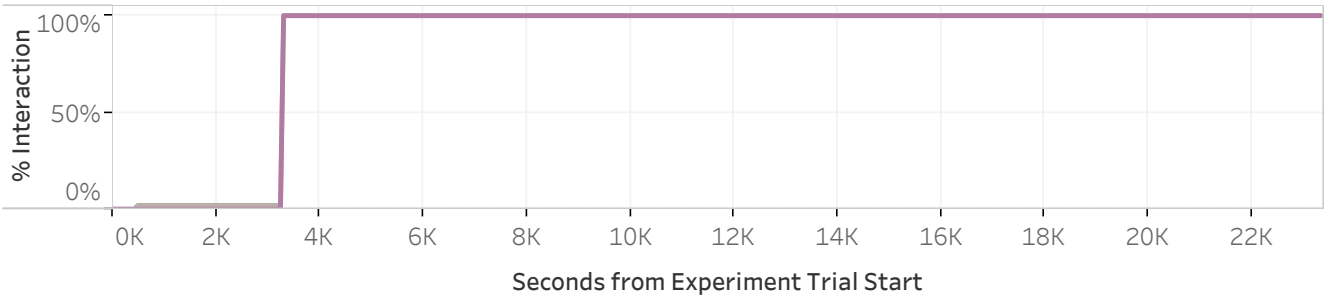
Real & Decoy Packets per Minute

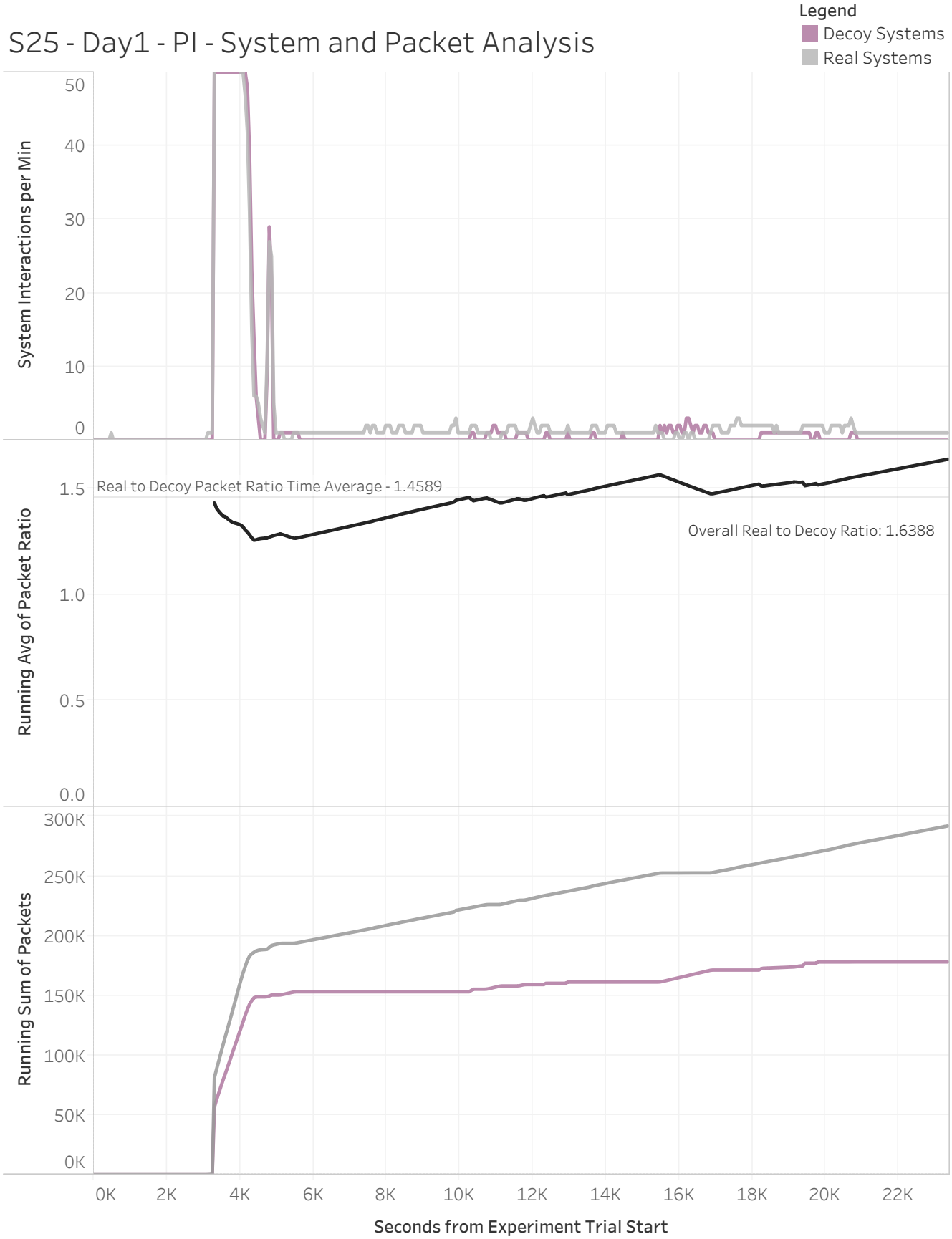


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

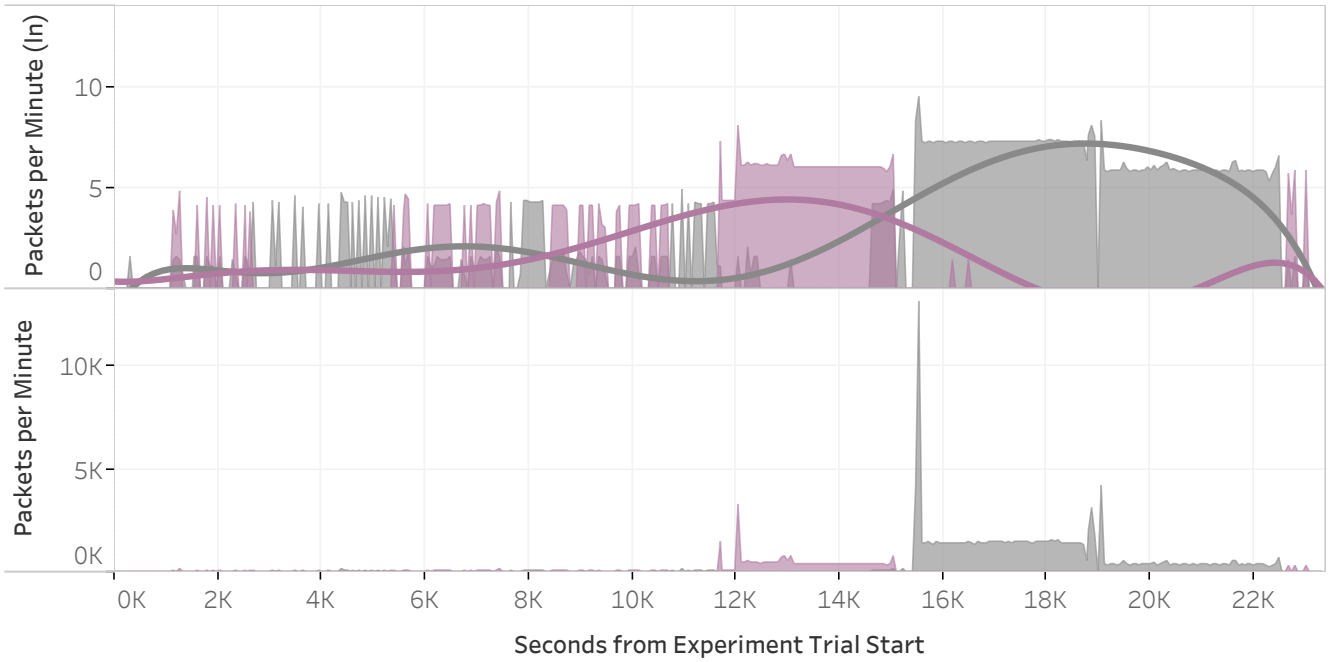



S25 - Day1 - PI - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
1.5
1.0
0.5
0.0
Real to Decoy Packet Ratio Time Average - 1.4589
Overall Real to Decoy Ratio: 1.6388
Running Sum of Packets
300K
250K
200K
150K
100K
50K
0K
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

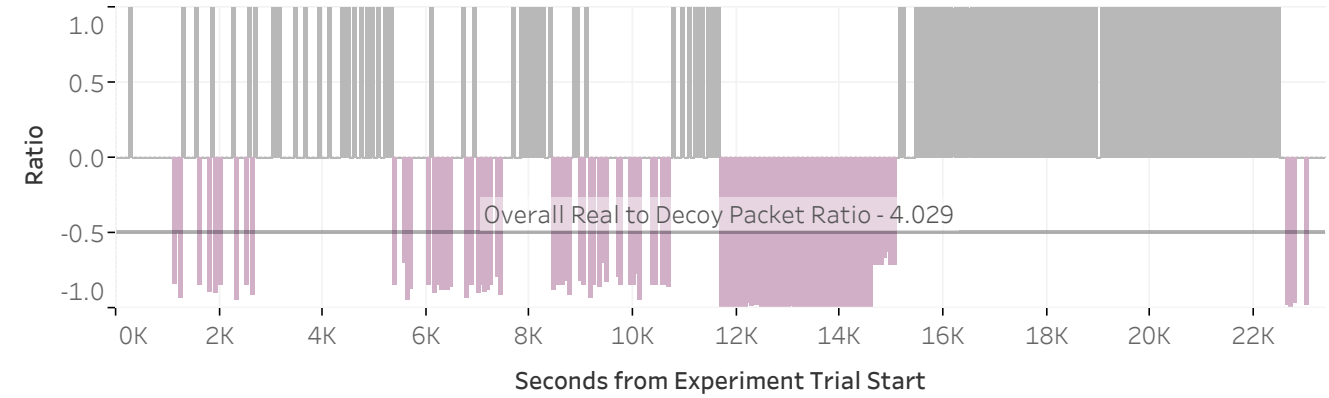
S26 - Day1 - PI

Legend
Real Systems
Decoy Systems

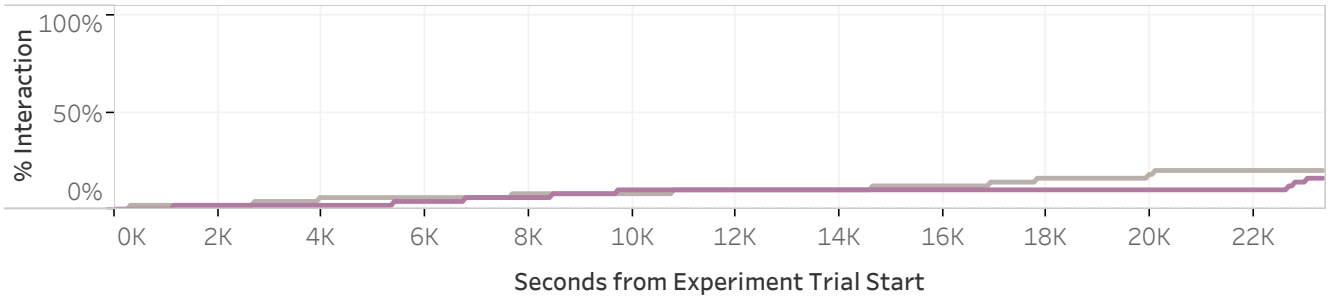
Real & Decoy Packets per Minute

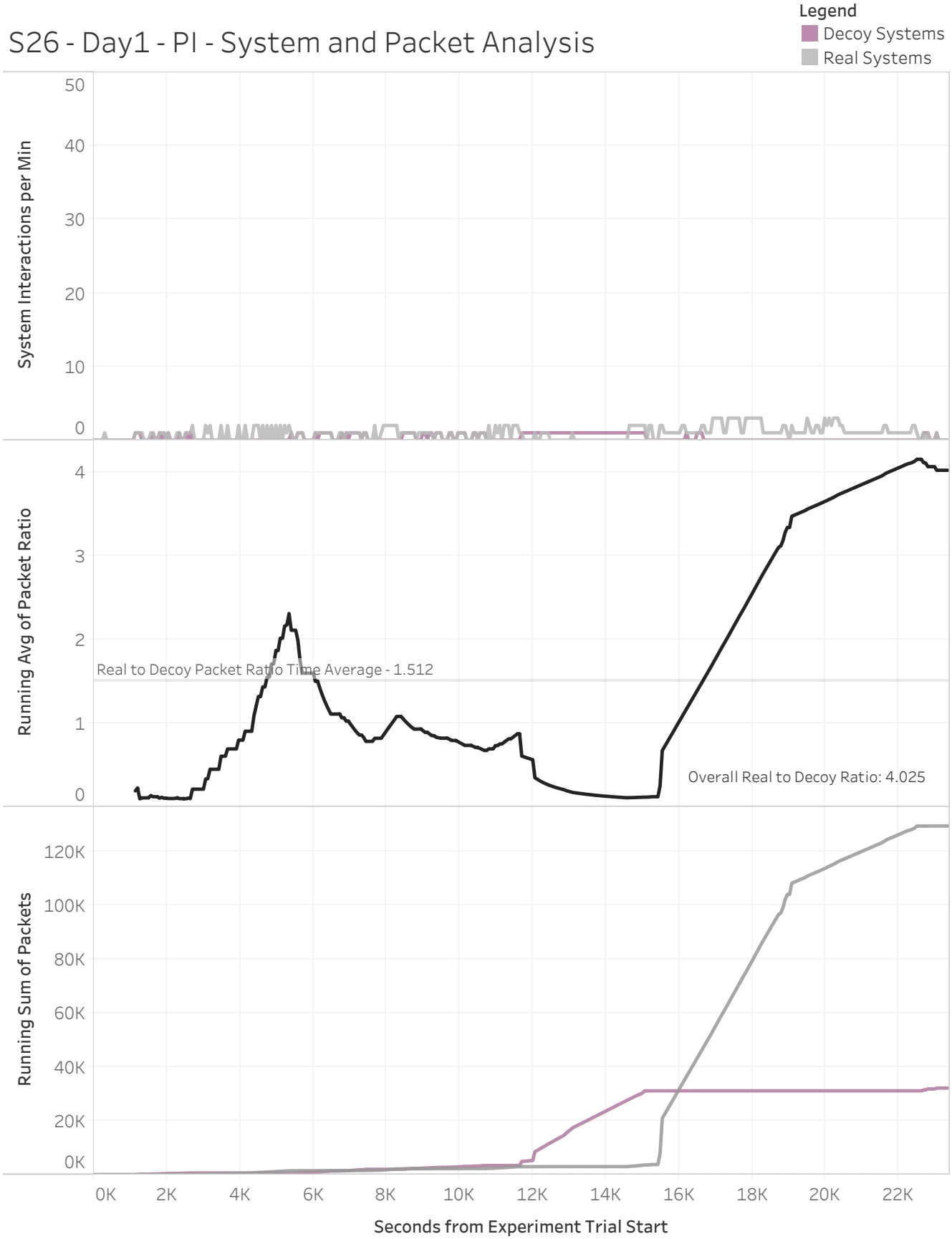


Real to Decoy Packet Ratio



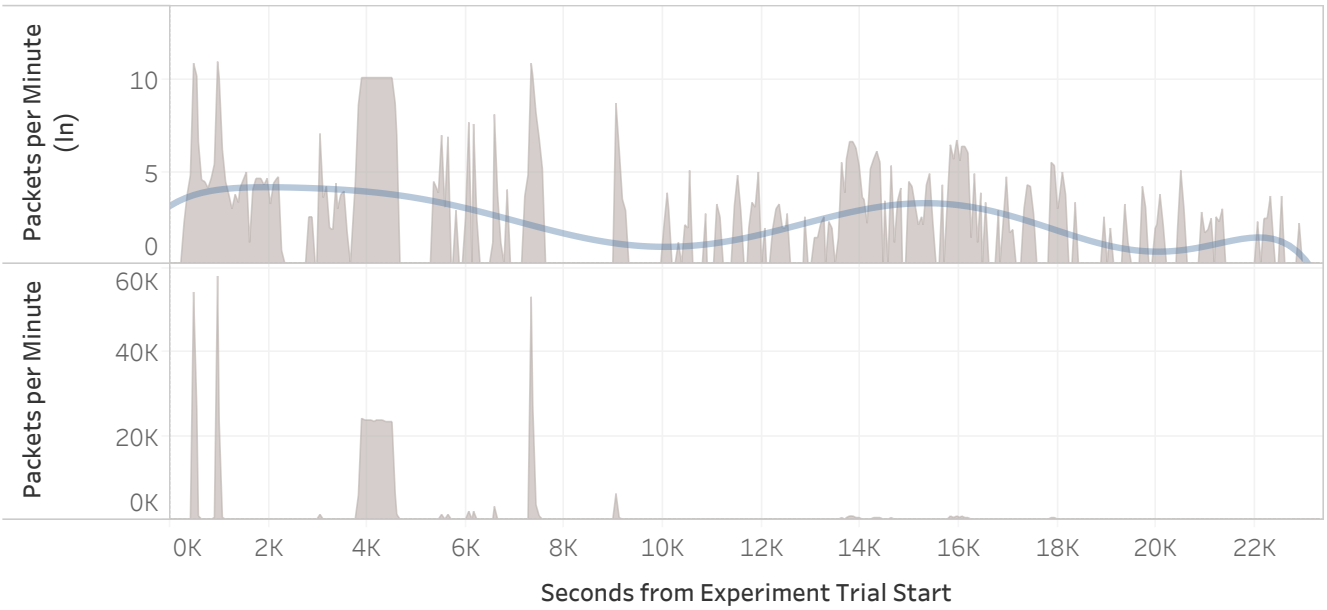
Real & Decoy System Interaction Timeline



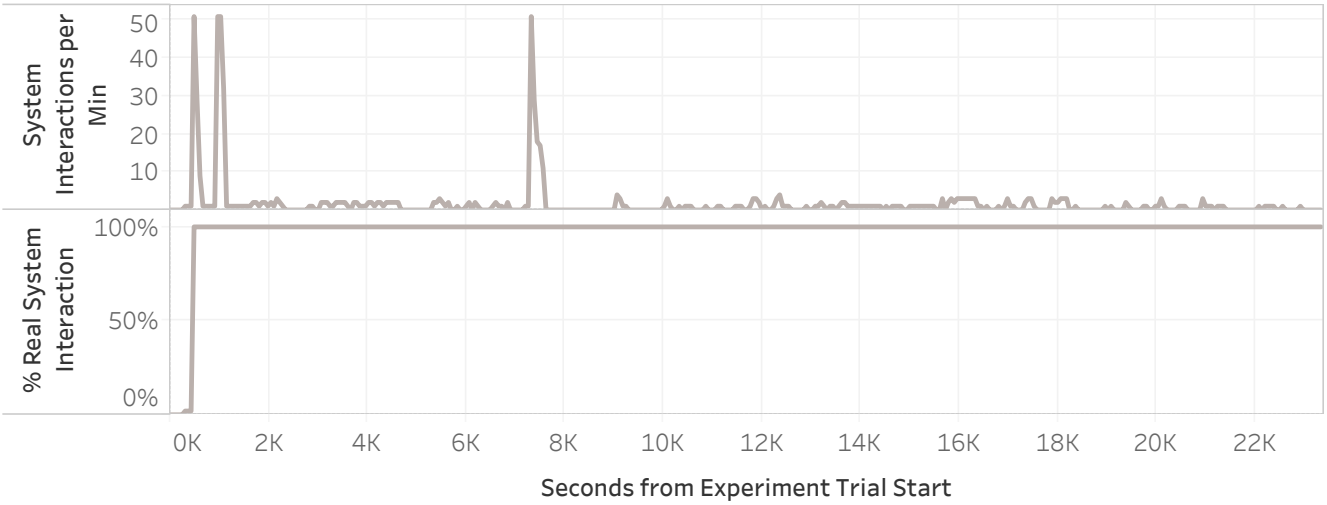

S26 - Day1 - PI - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
4
3
2
1
0
Real to Decoy Packet Ratio Time Average - 1.512
Overall Real to Decoy Ratio: 4.025
Running Sum of Packets
120K
100K
80K
60K
40K
20K
0K
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

S27 - Day 1 - AI

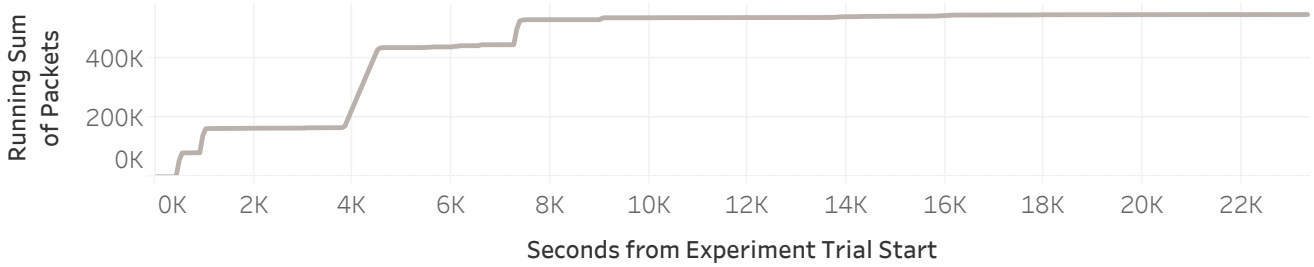
Real Packets per Minute



Real System Interaction Timeline

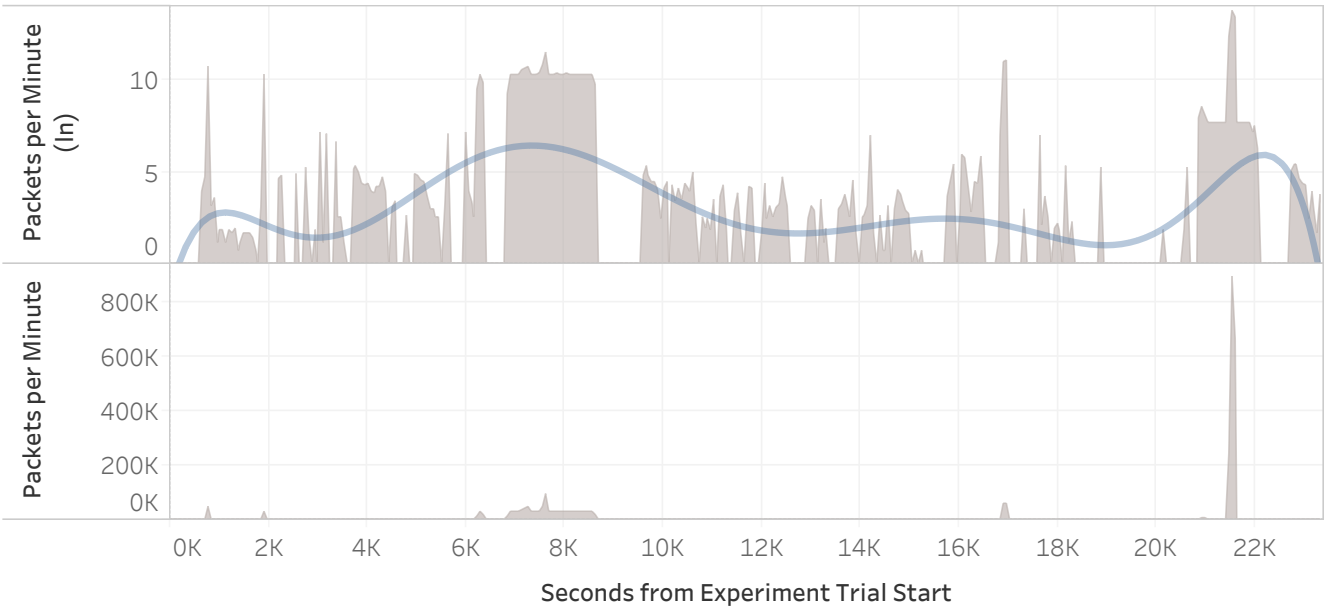


Running Sum of Packets

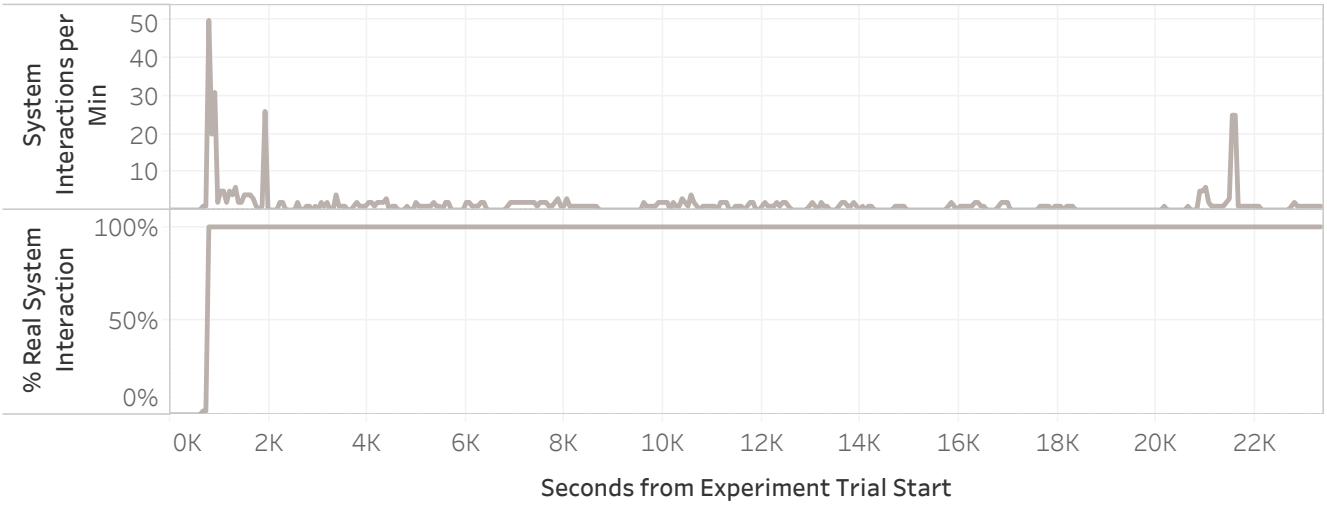


S28 - Day 1 - AI

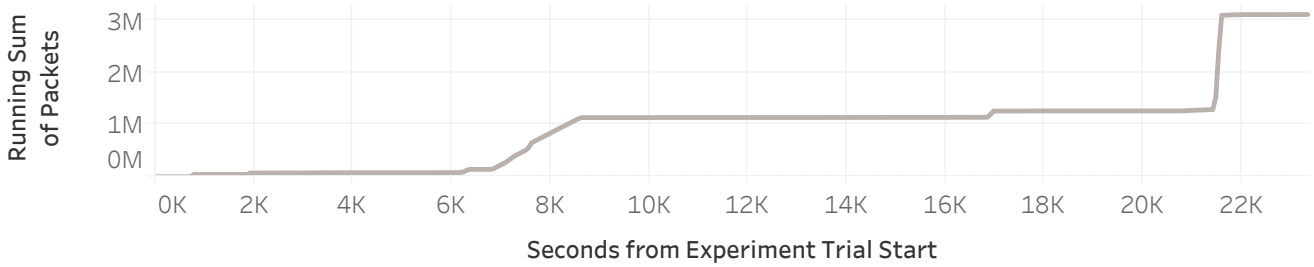
Real Packets per Minute



Real System Interaction Timeline

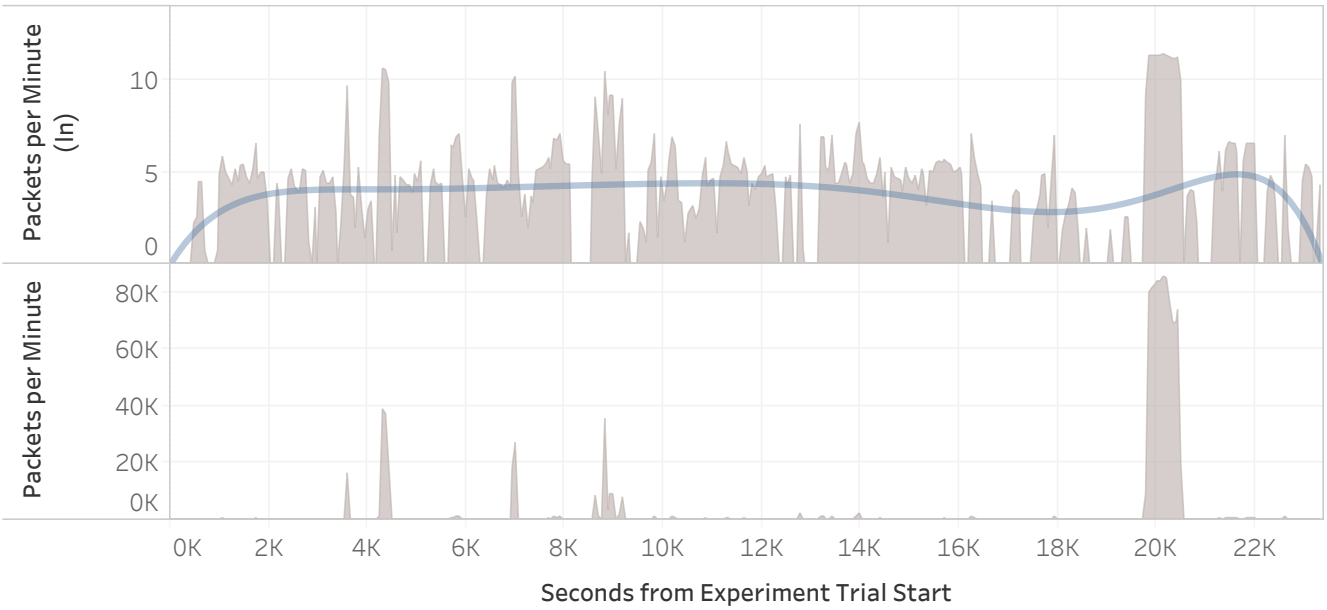


Running Sum of Packets

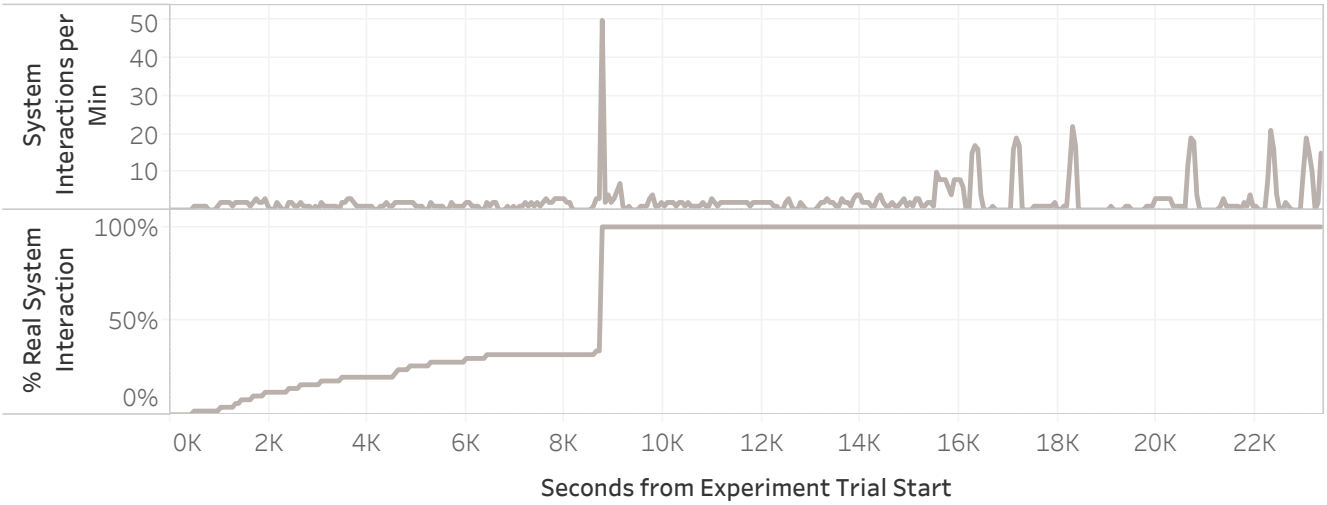


S29 - Day 1 - AI

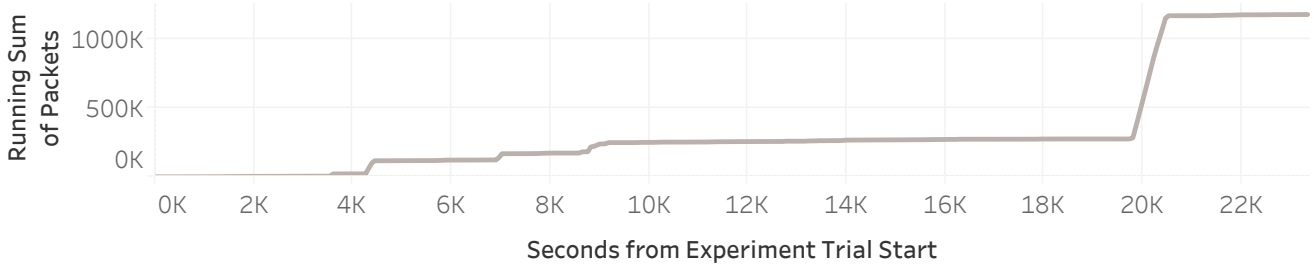
Real Packets per Minute



Real System Interaction Timeline

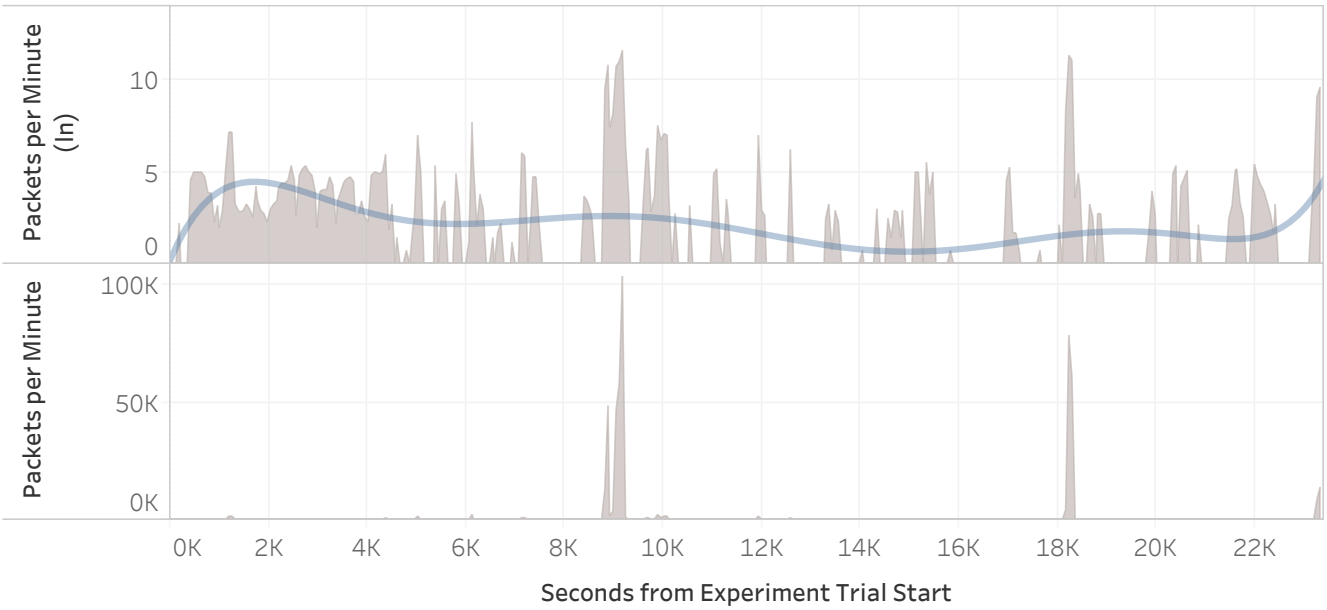


Running Sum of Packets

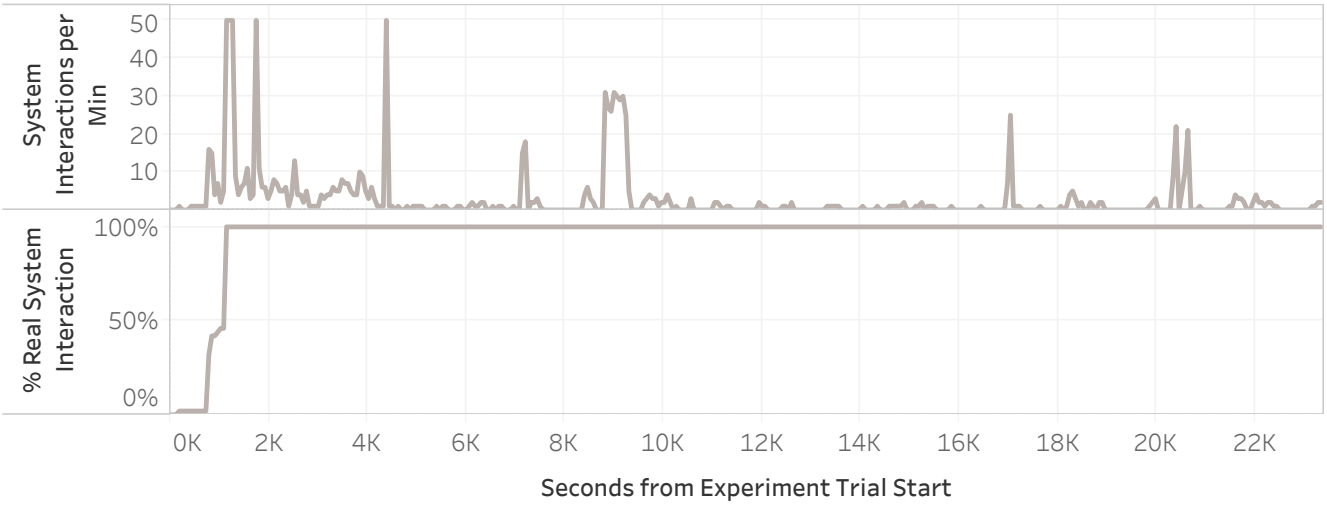


S30 - Day 1 - AI

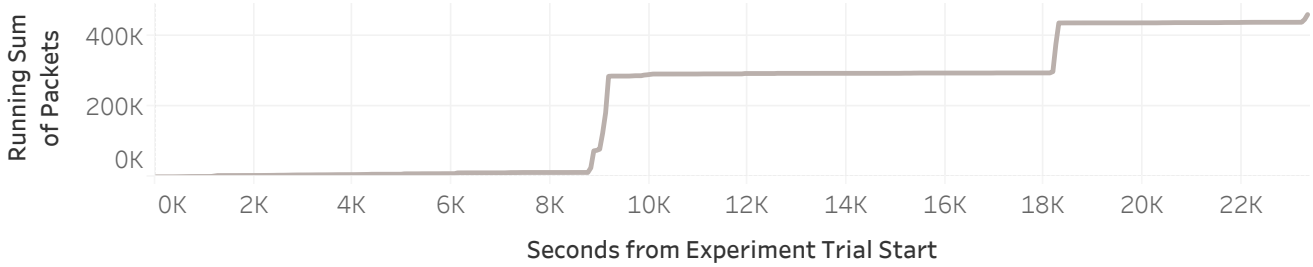
Real Packets per Minute



Real System Interaction Timeline

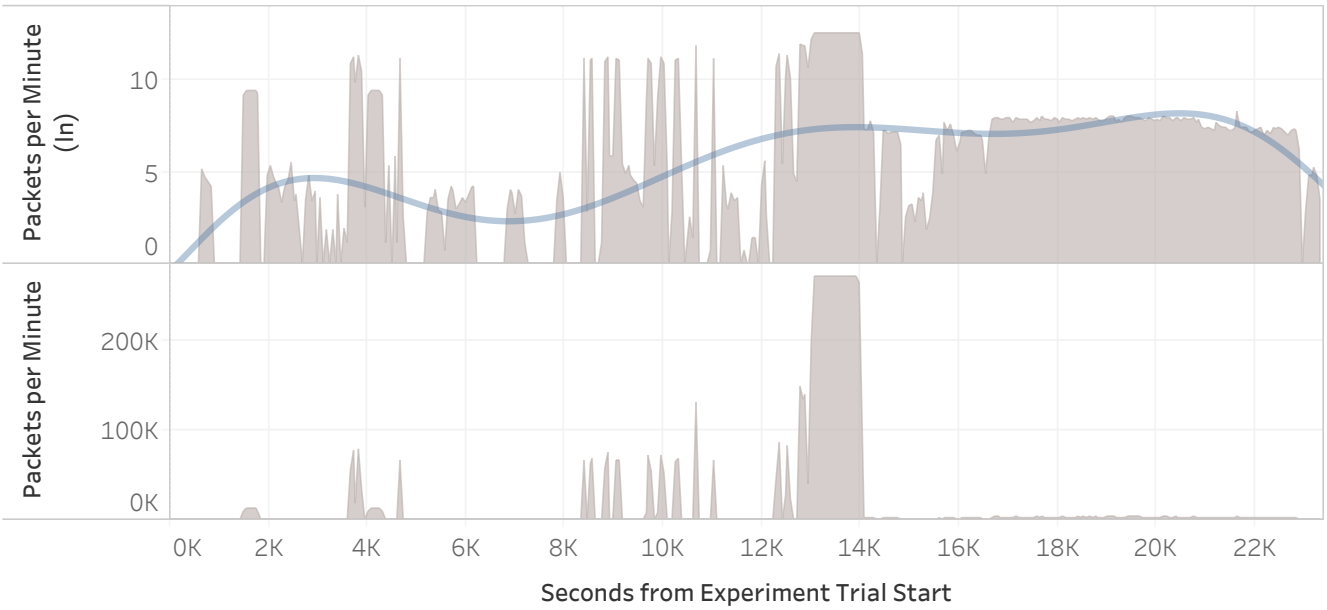


Running Sum of Packets

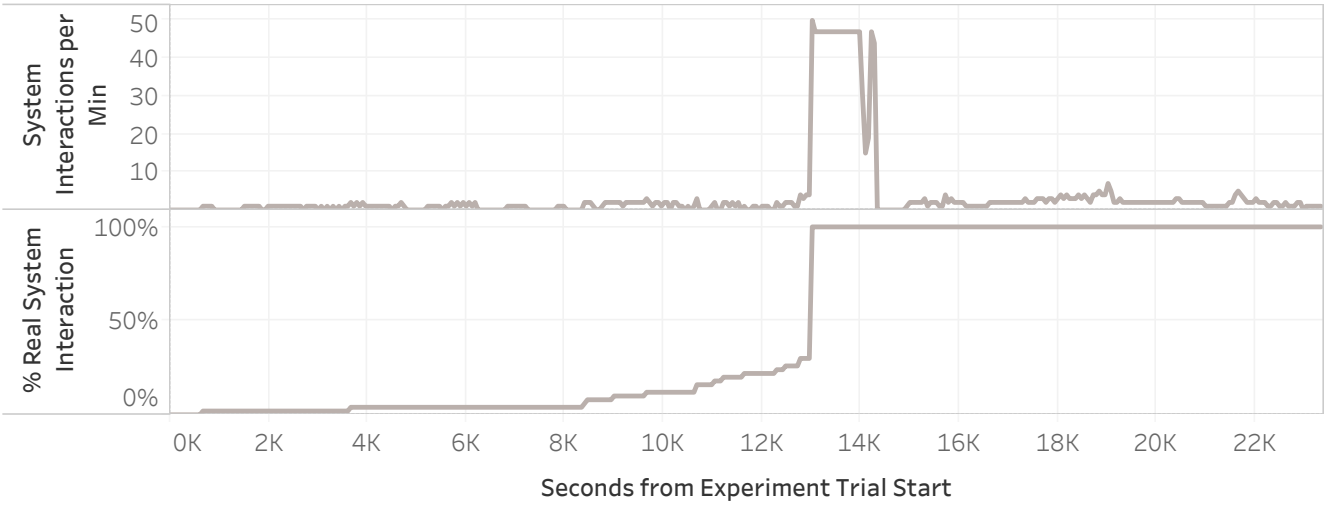


S31 - Day 1 - AI

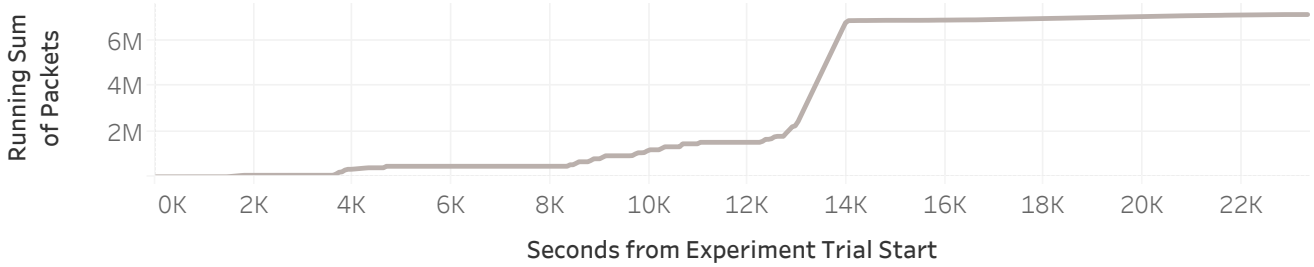
Real Packets per Minute



Real System Interaction Timeline

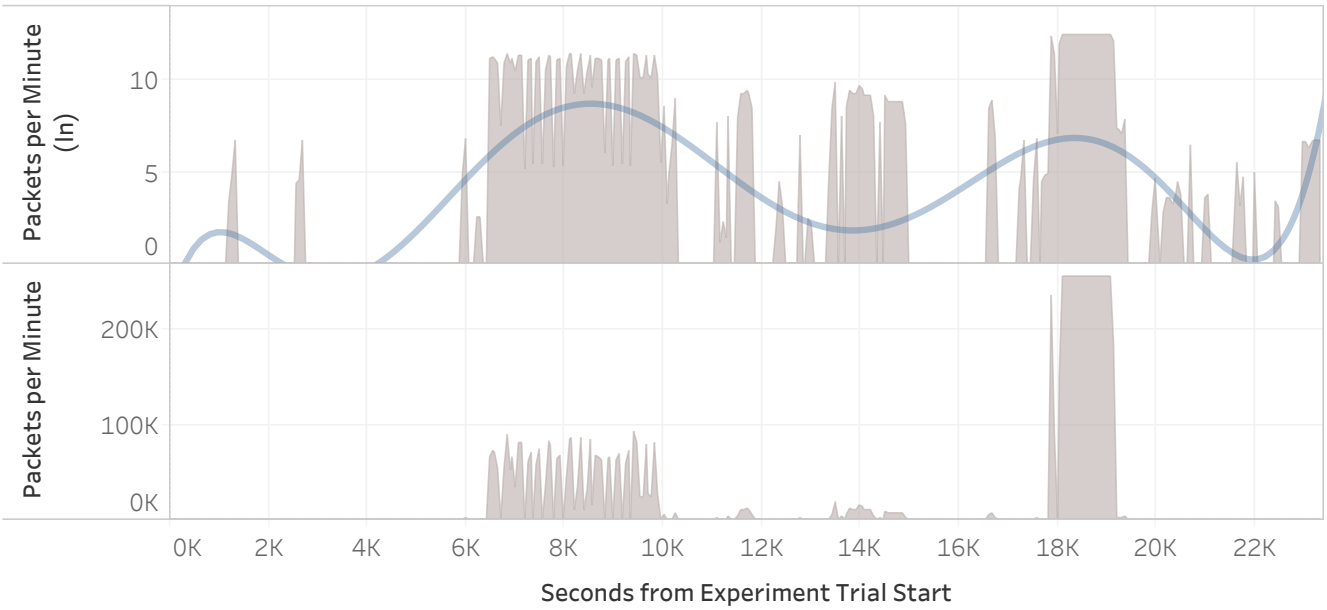


Running Sum of Packets

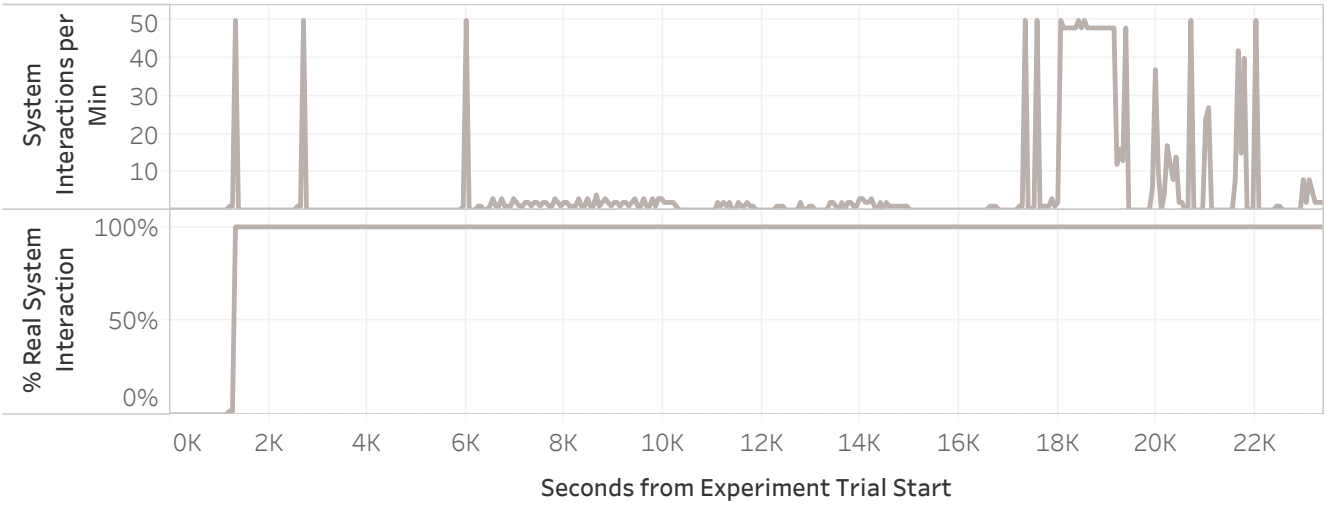


S32 - Day 1 - AI

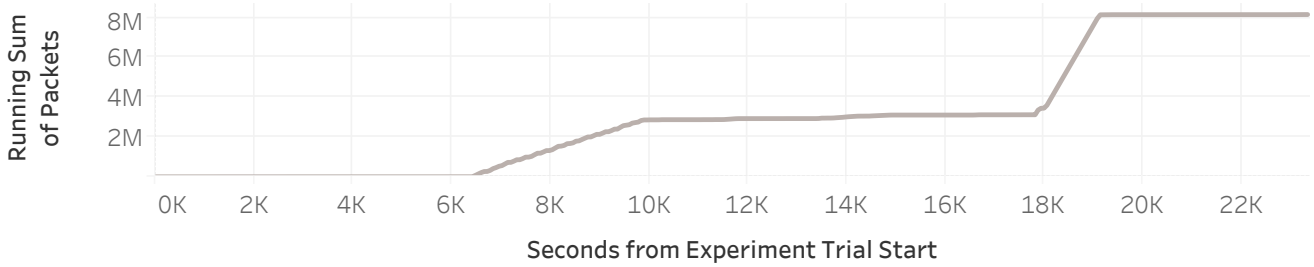
Real Packets per Minute



Real System Interaction Timeline



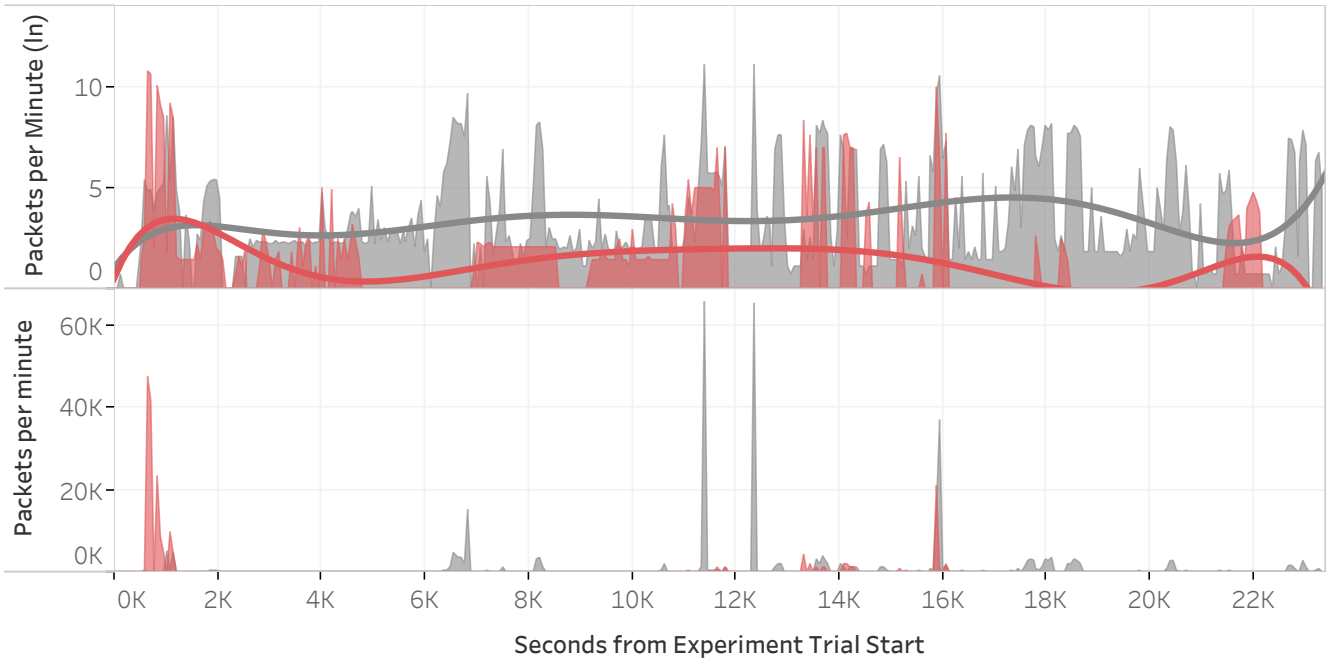
Running Sum of Packets



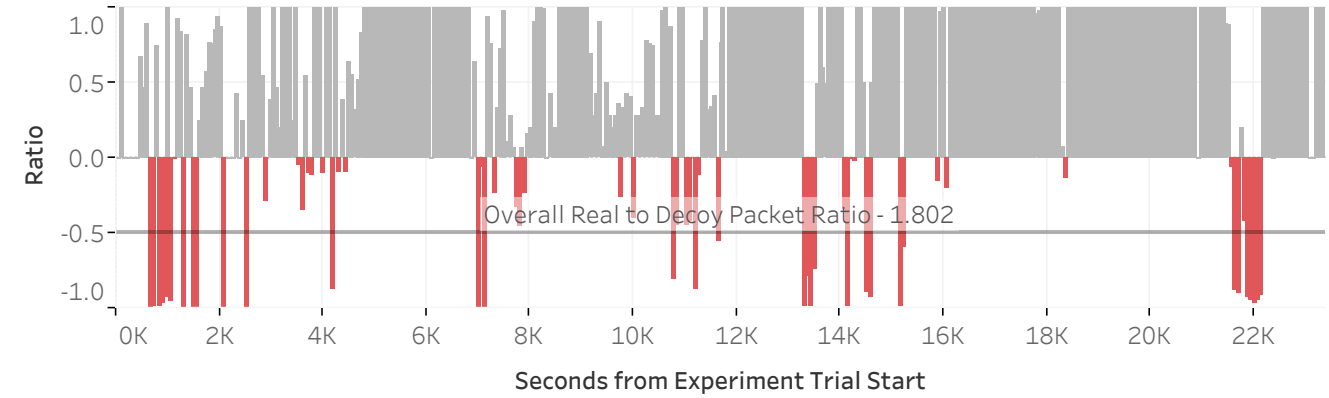
S43 - Day1 - PU

Legend
Real Systems
Decoy Systems

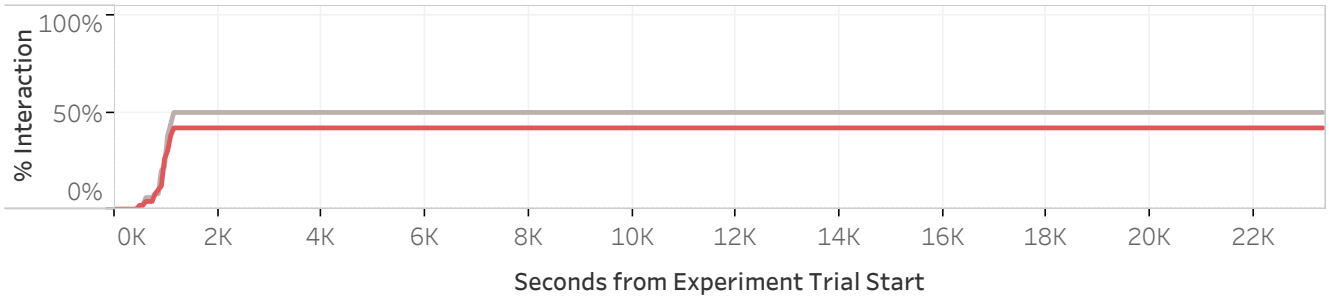
Real & Decoy Packets per Minute

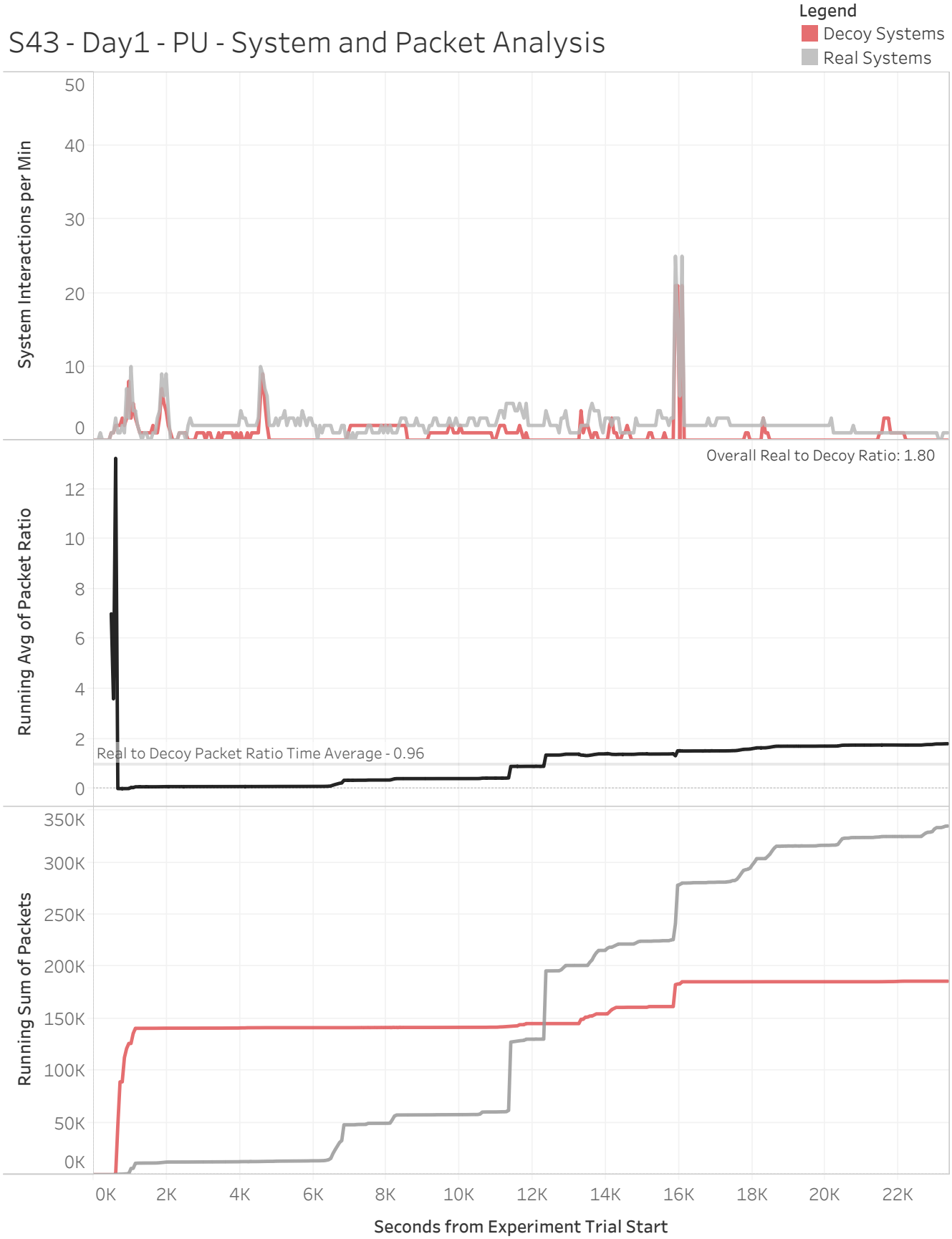


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

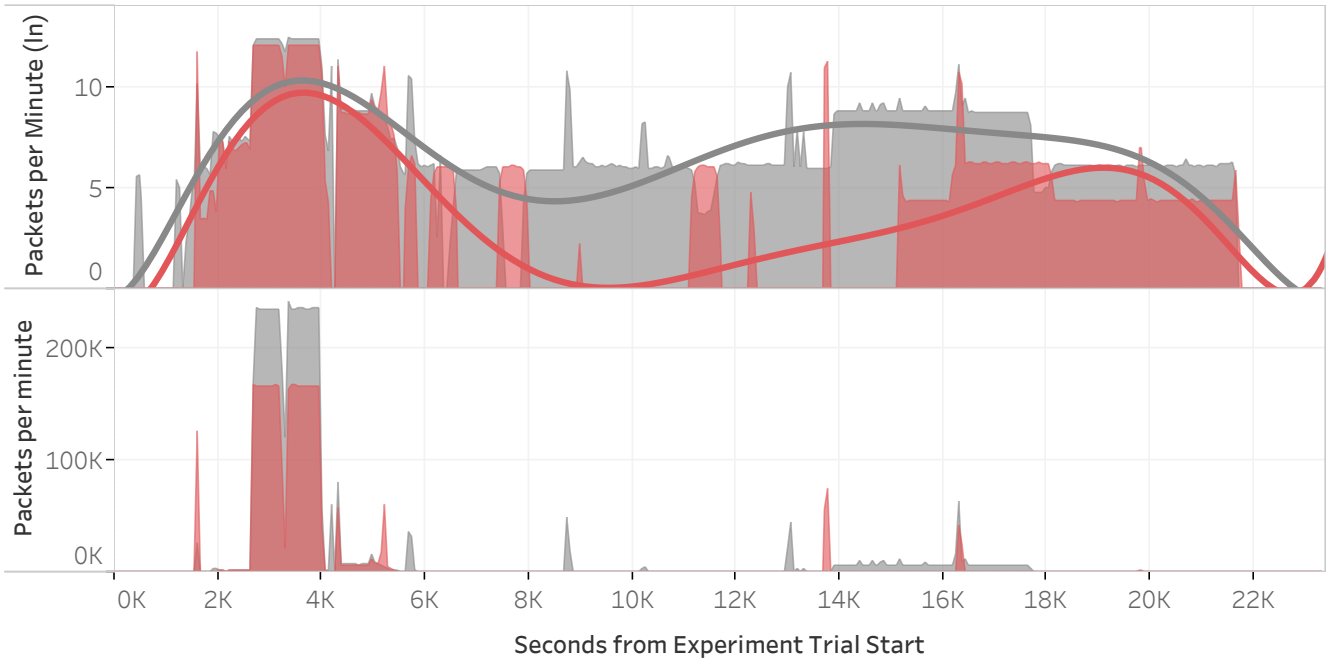



S43 - Day1 - PU - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Overall Real to Decoy Ratio: 1.80
Running Avg of Packet Ratio
12
10
8
6
4
2
0
Real to Decoy Packet Ratio Time Average - 0.96
Running Sum of Packets
350K
300K
250K
200K
150K
100K
50K
0K
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

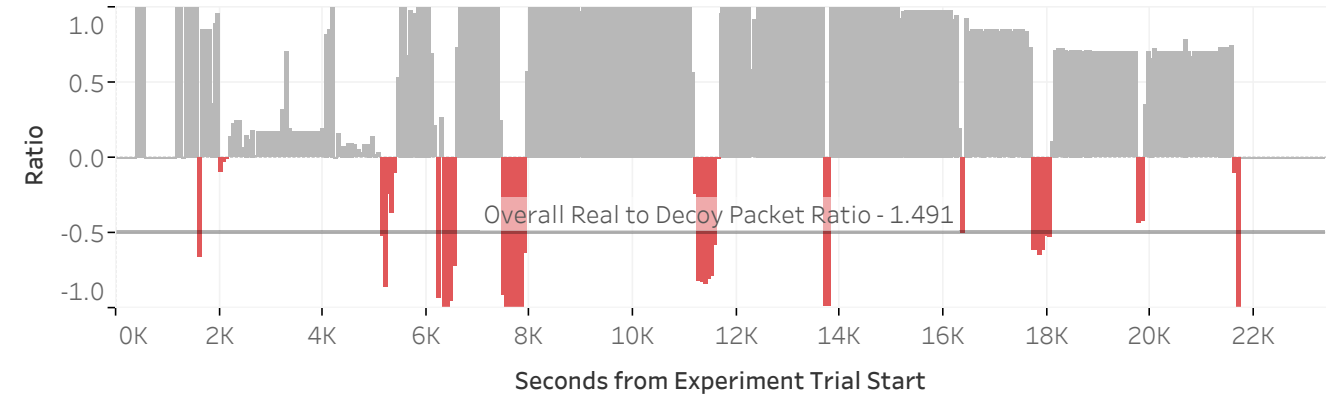
S44 - Day1 - PU

Legend
Real Systems
DecoyInteraction

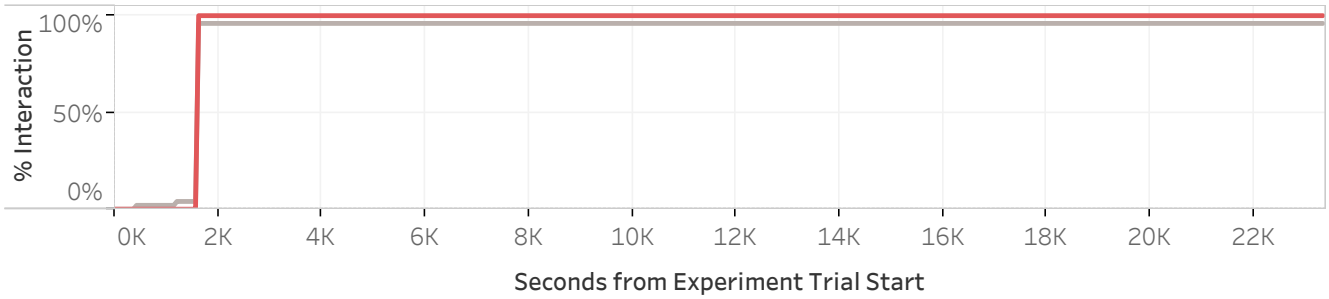
Real & Decoy Packets per Minute

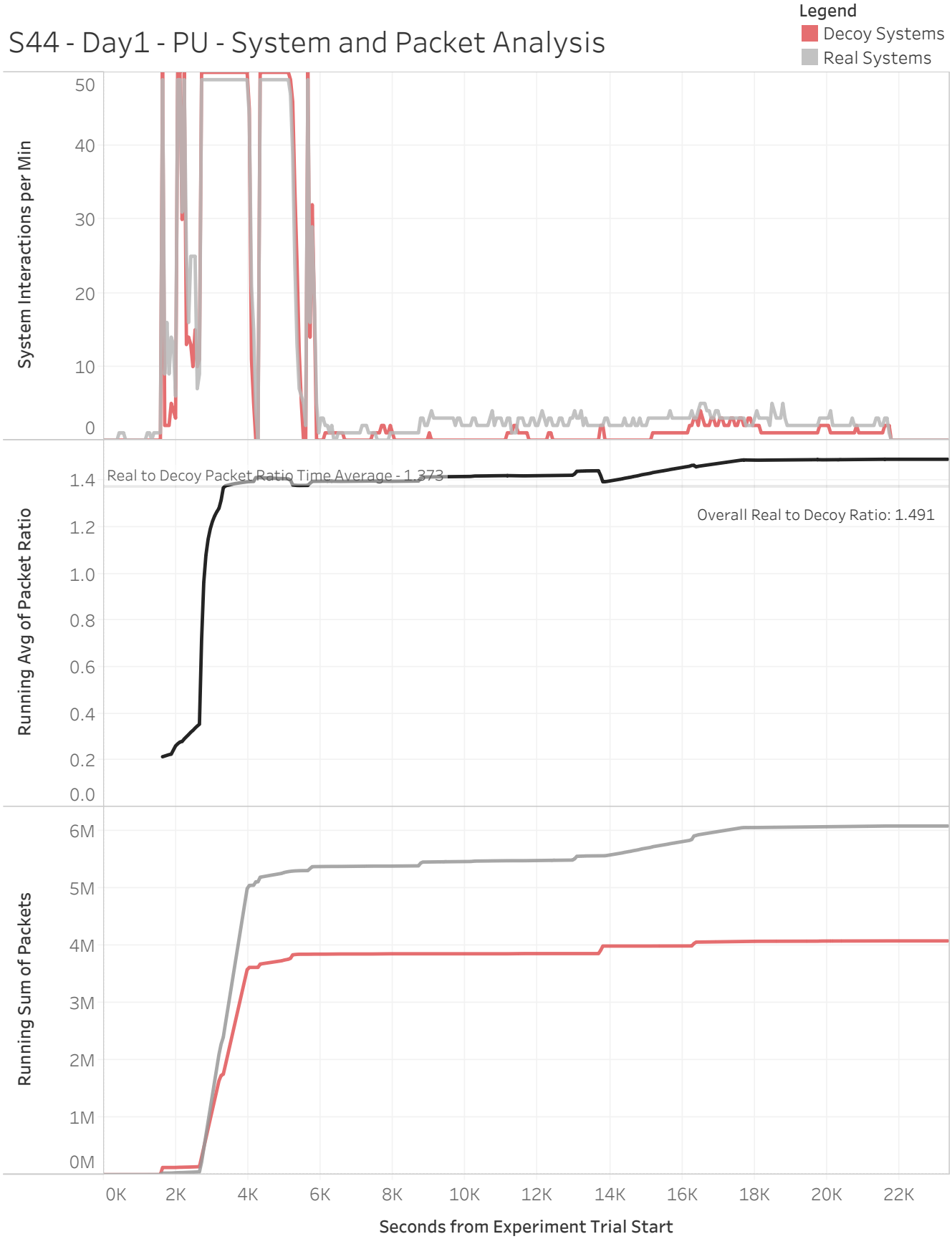


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

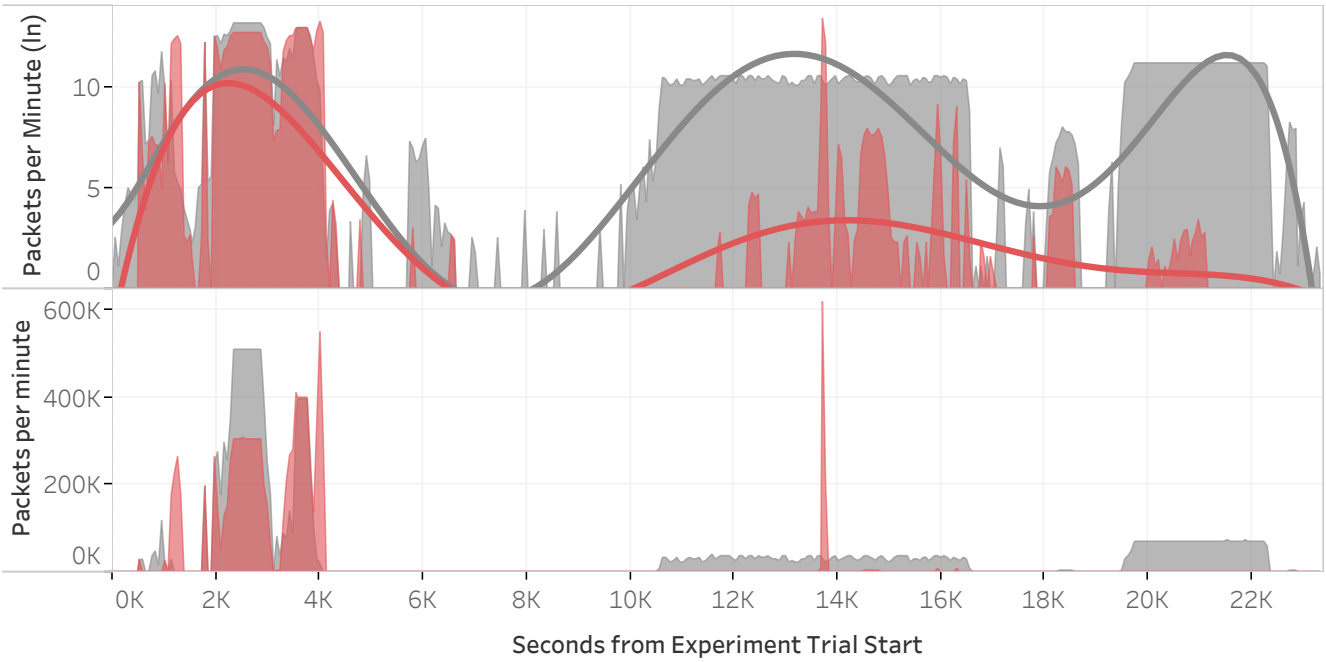



S44 - Day1 - PU - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
Real to Decoy Packet Ratio Time Average - 1.373
Overall Real to Decoy Ratio: 1.491
Running Sum of Packets
6M
5M
4M
3M
2M
1M
0M
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

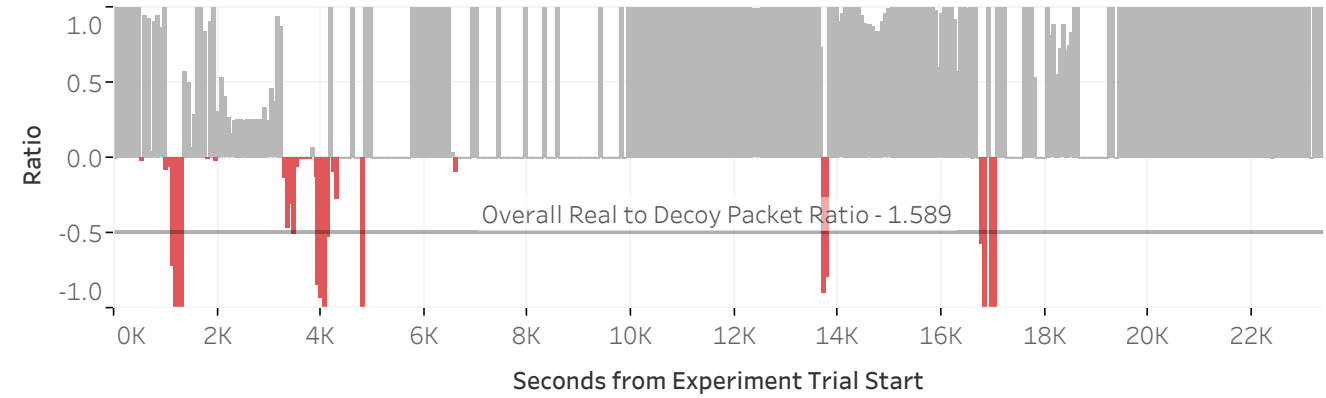
S45 - Day1 - PU

Legend
Real Systems
Decoy Systems

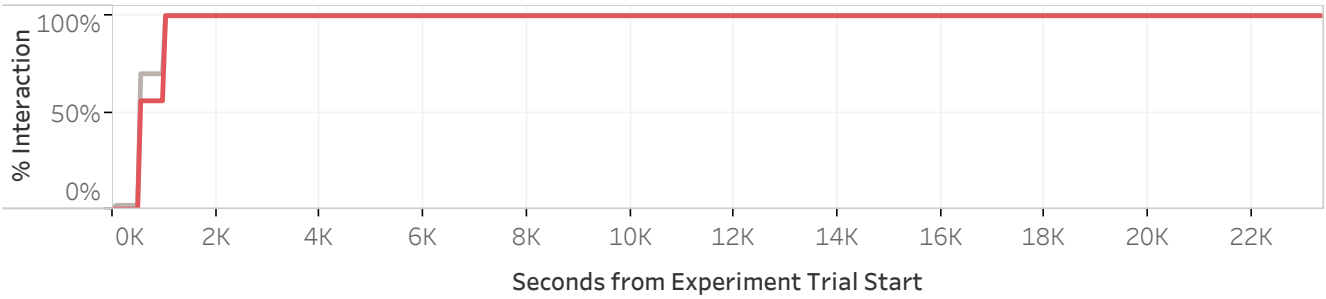
Real & Decoy Packets per Minute

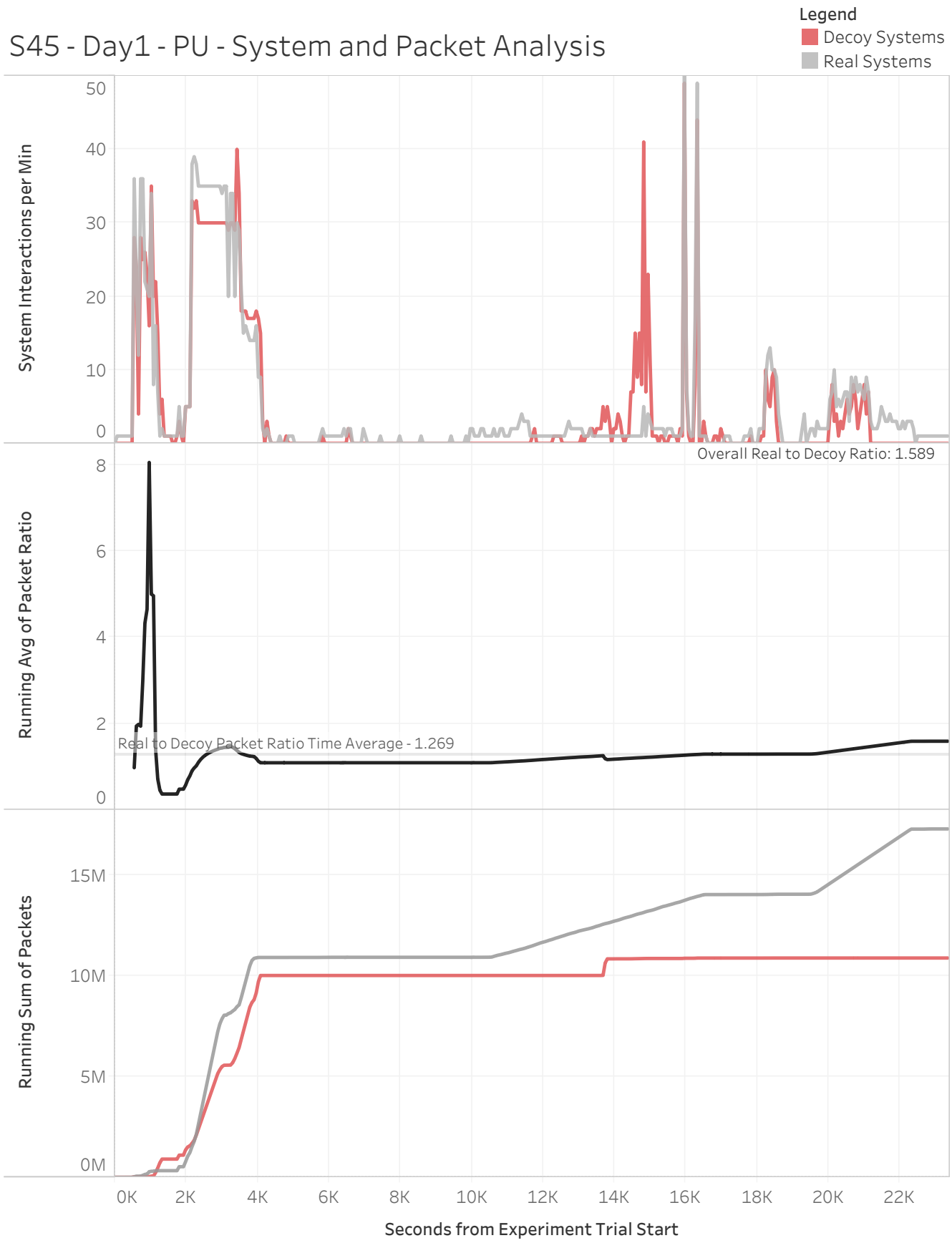


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

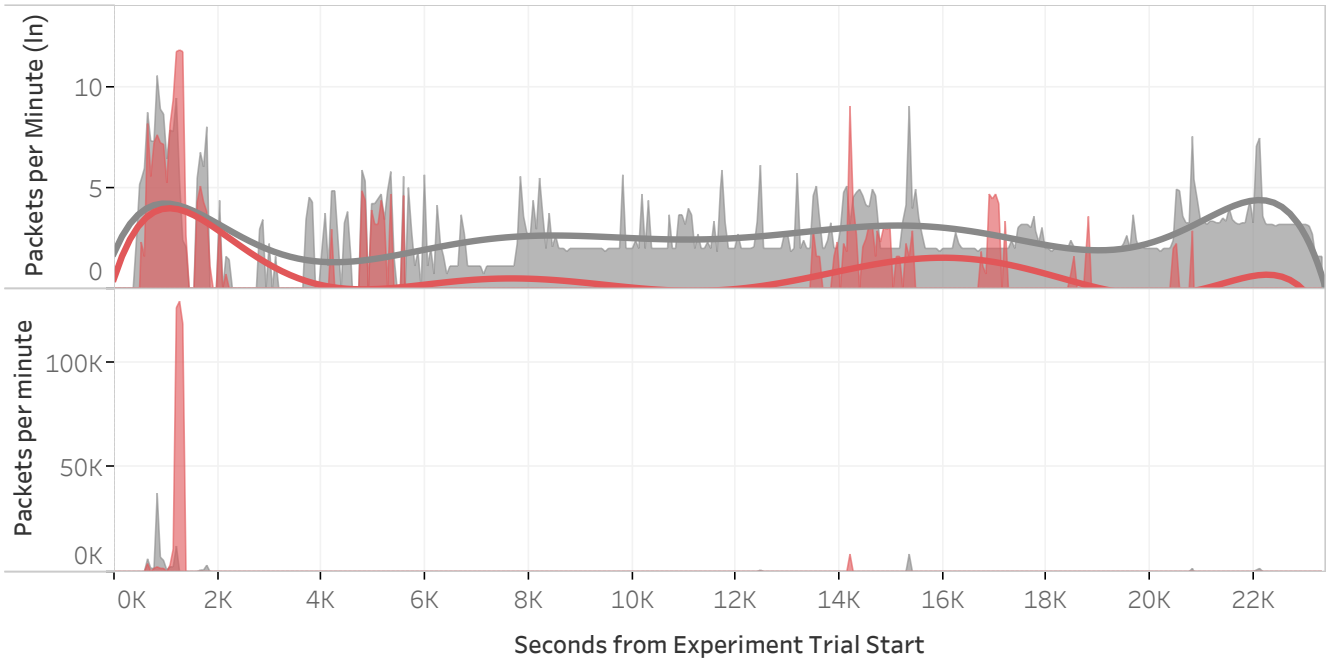



S45 - Day1 - PU - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Overall Real to Decoy Ratio: 1.589
Running Avg of Packet Ratio
8
6
4
2
0
Real to Decoy Packet Ratio Time Average - 1.269
Running Sum of Packets
15M
10M
5M
0M
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

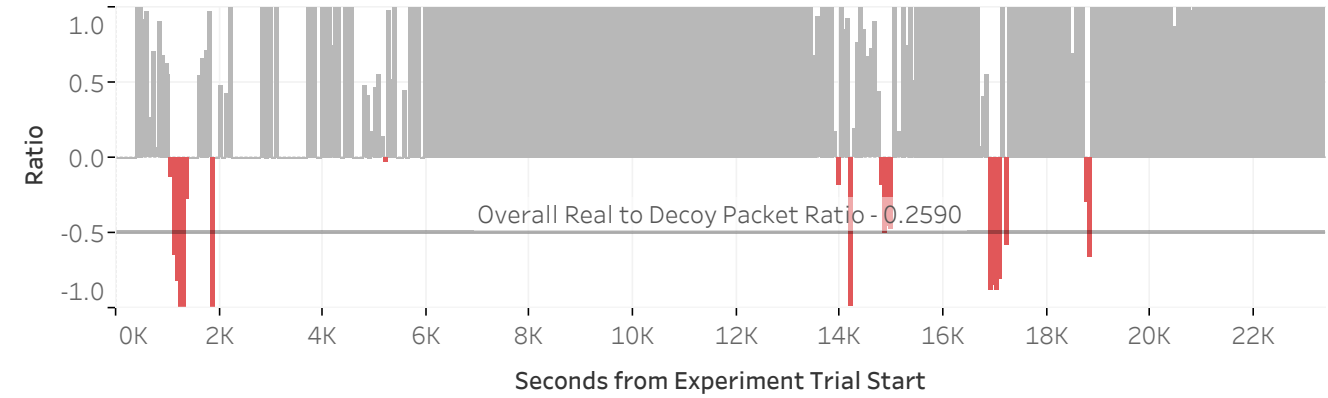
S46 - Day1 - PU

Legend
Real Systems
Decoy Systems

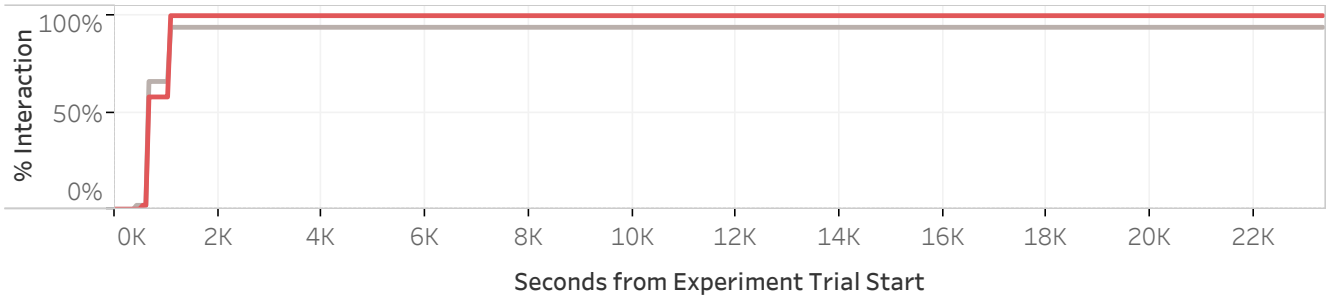
Real & Decoy Packets per Minute

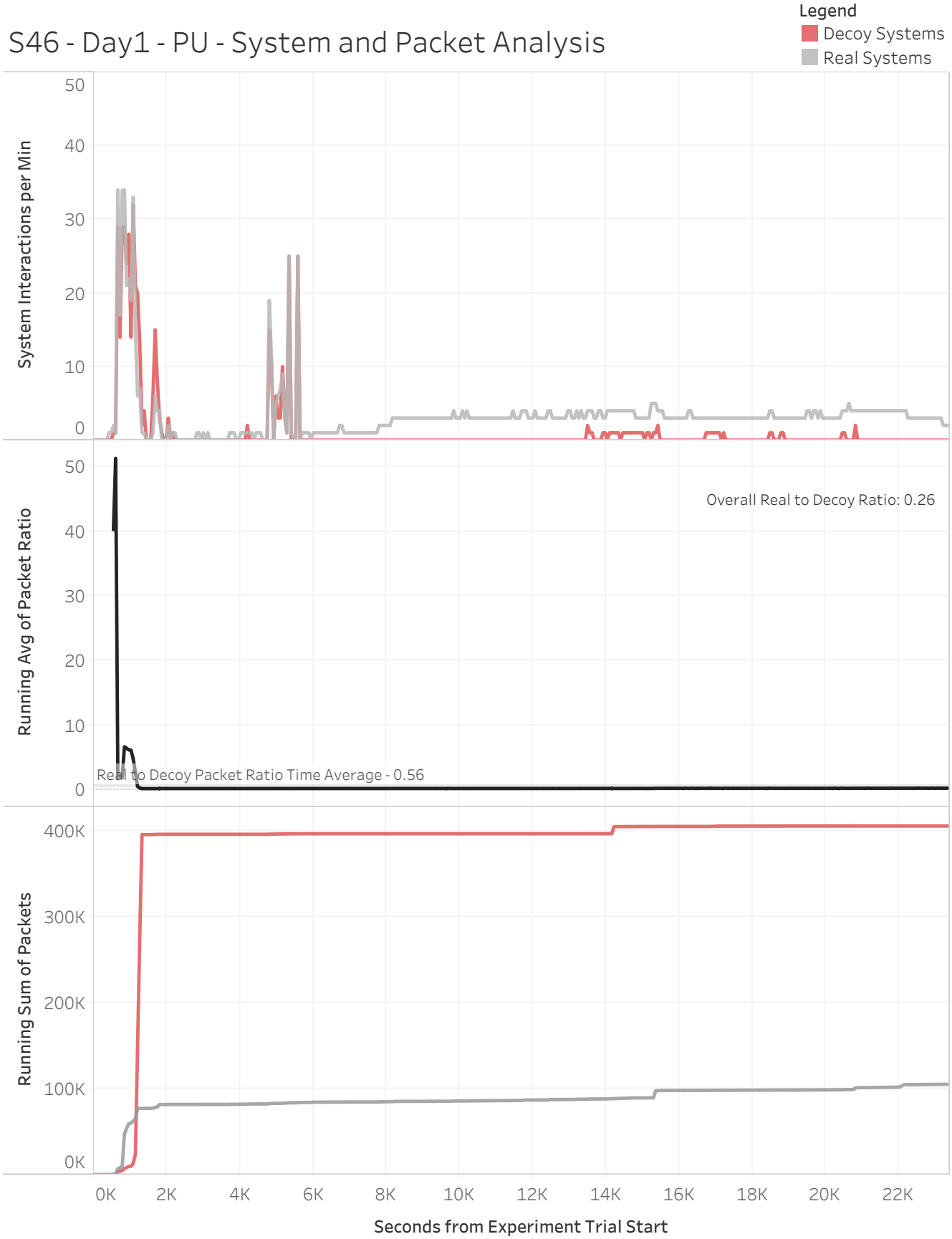


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

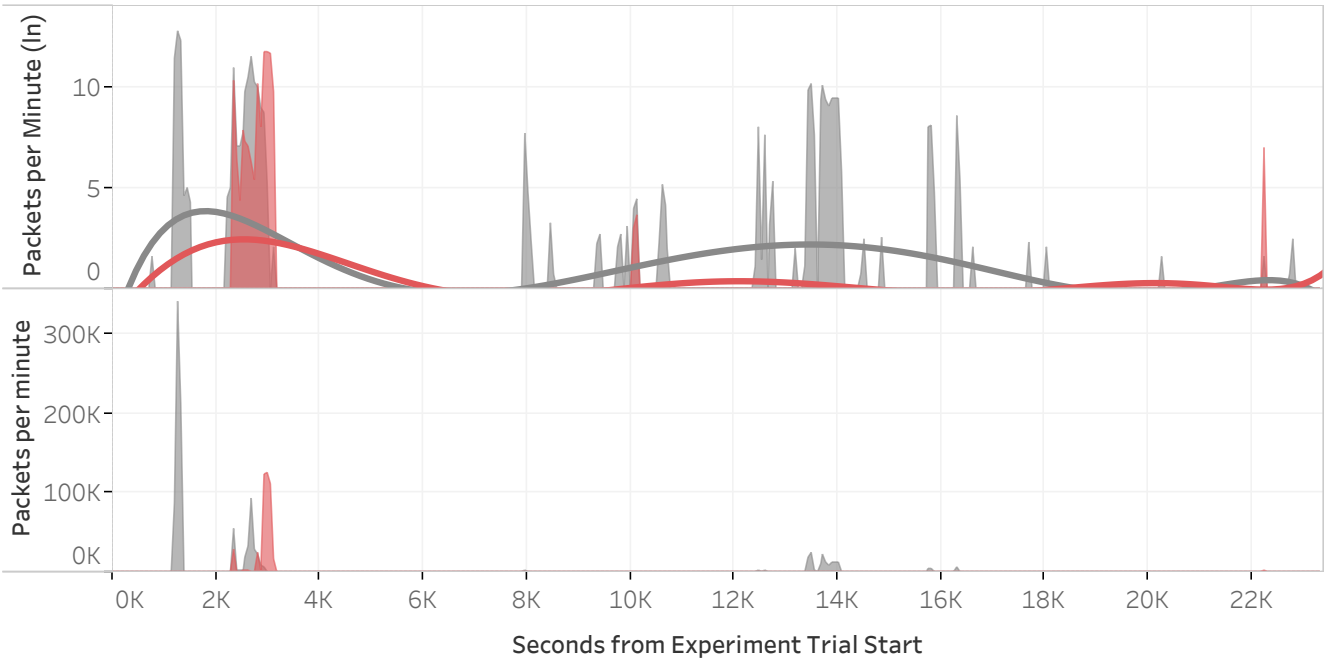



S46 - Day1 - PU - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
Overall Real to Decoy Ratio: 0.26
Real to Decoy Packet Ratio Time Average - 0.56
Running Sum of Packets
400K
300K
200K
100K
0K
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

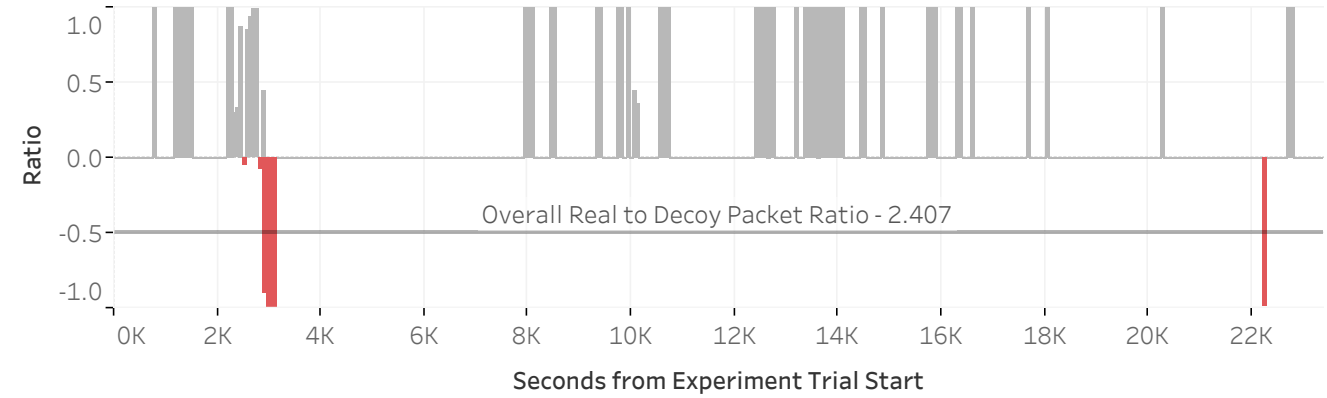
S47 - Day1 - PU

Legend
Real Systems
Decoy Systems

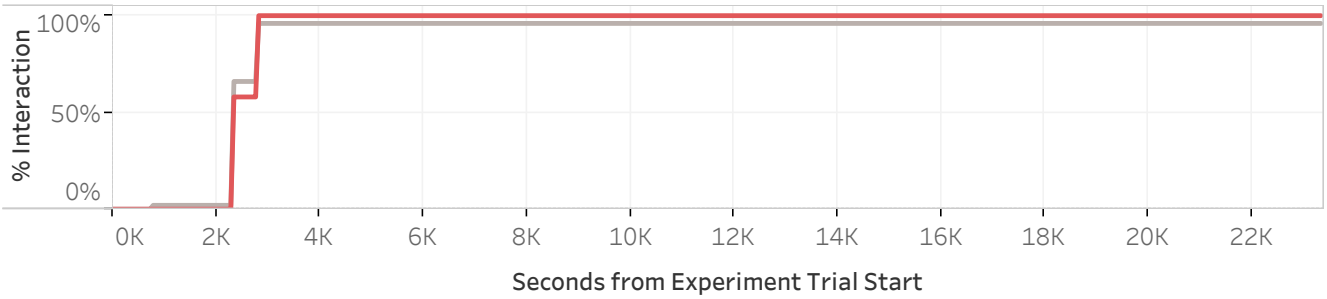
Real & Decoy Packets per Minute

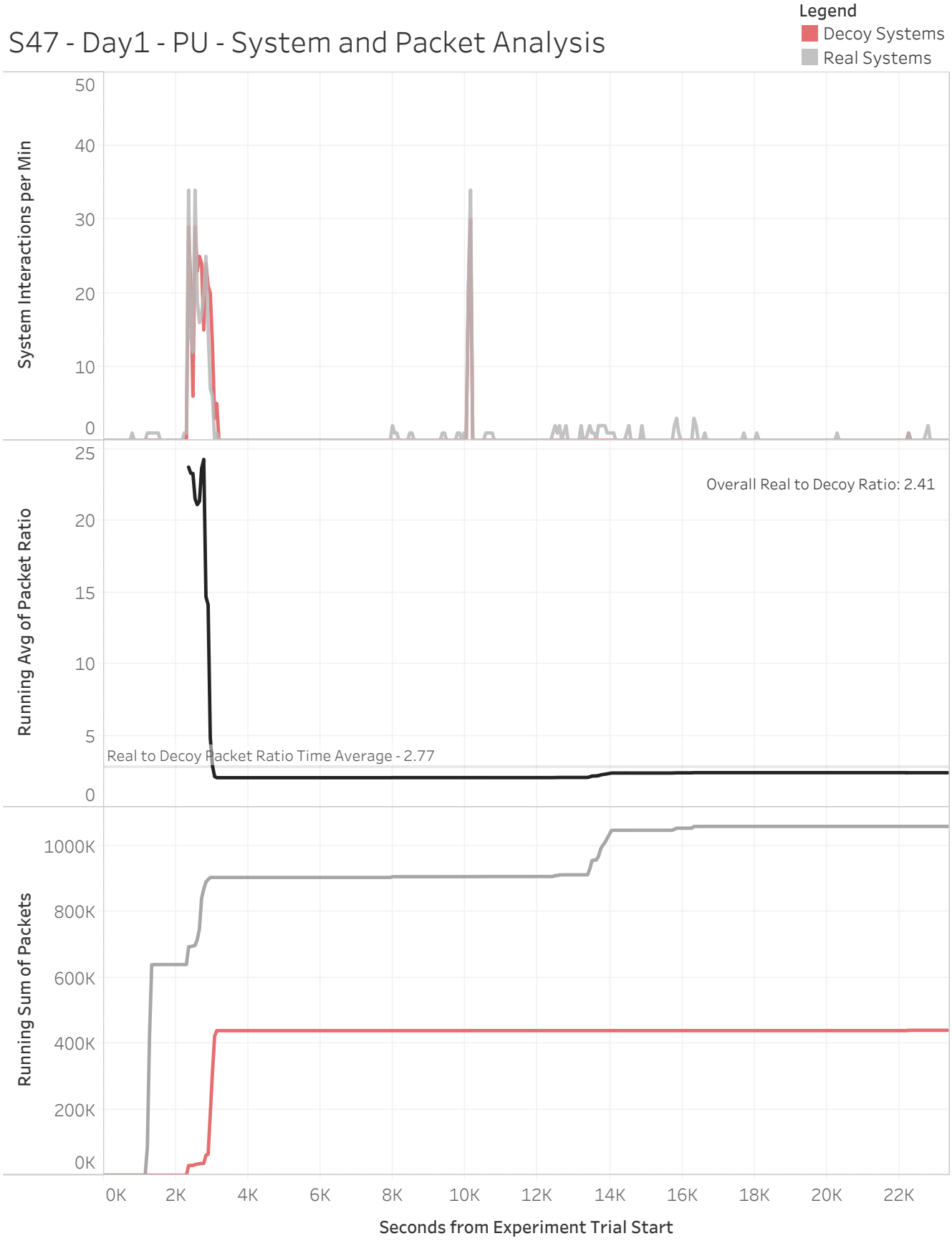


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

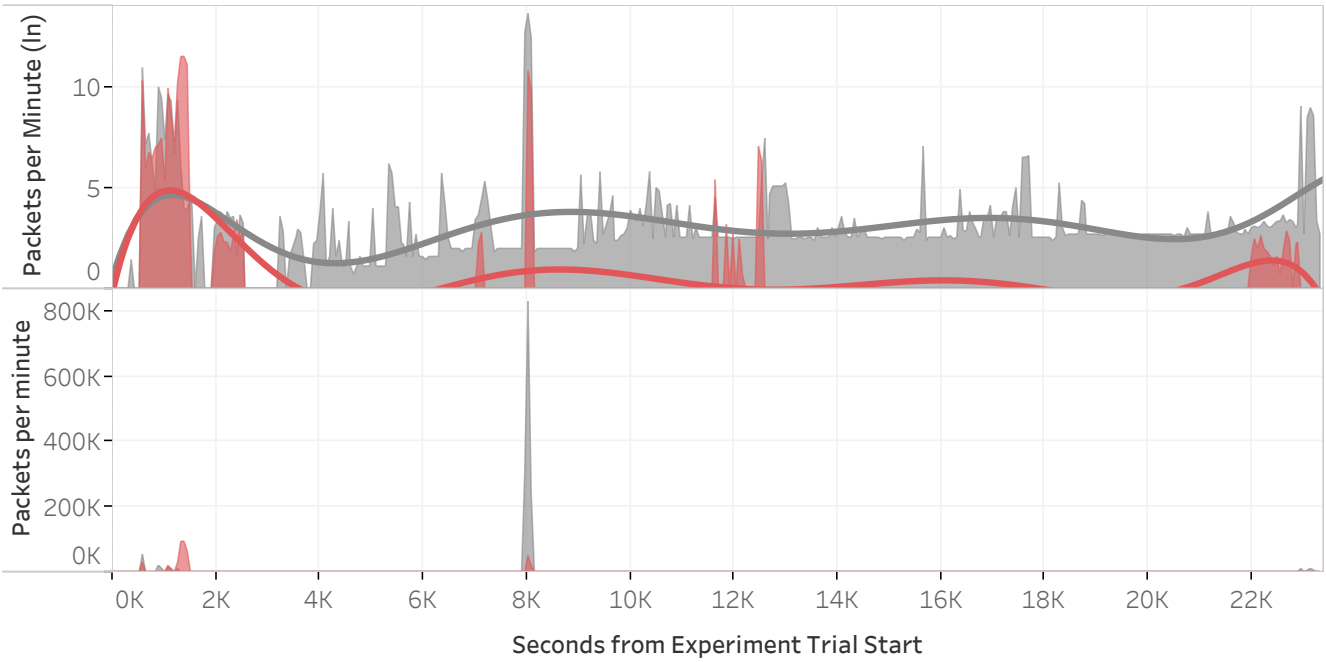



S47 - Day1 - PU - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
25
20
15
10
5
0
Overall Real to Decoy Ratio: 2.41
Real to Decoy Packet Ratio Time Average - 2.77
Running Sum of Packets
1000K
800K
600K
400K
200K
0K
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

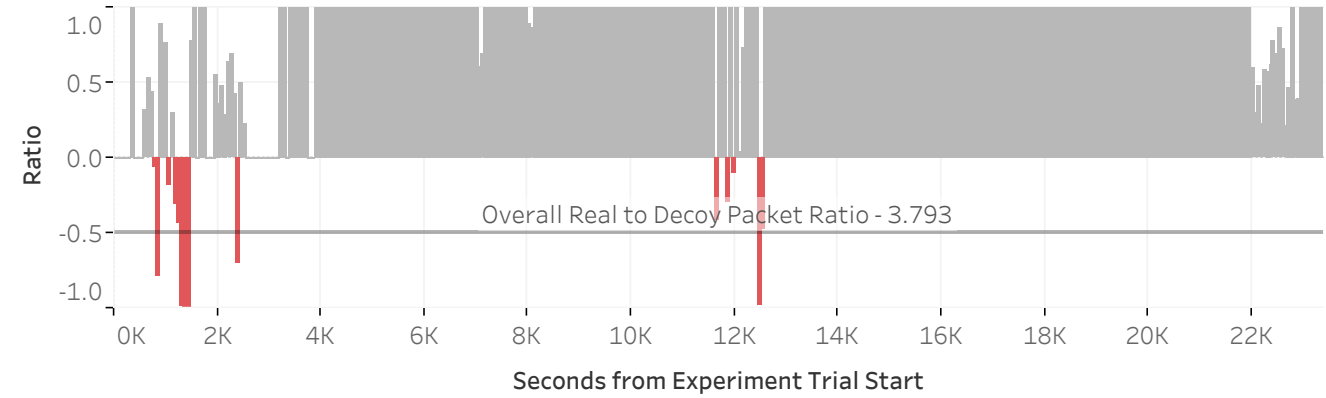
S48 - Day1 - PU

Legend
Real Systems
Decoy Systems

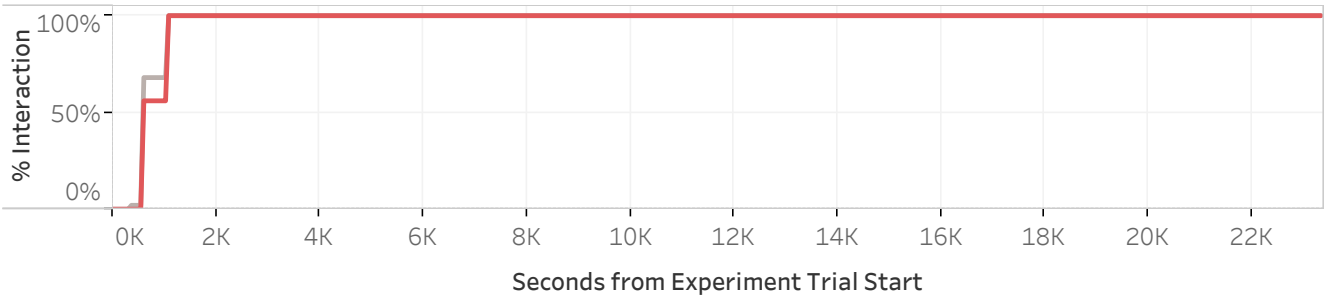
Real & Decoy Packets per Minute

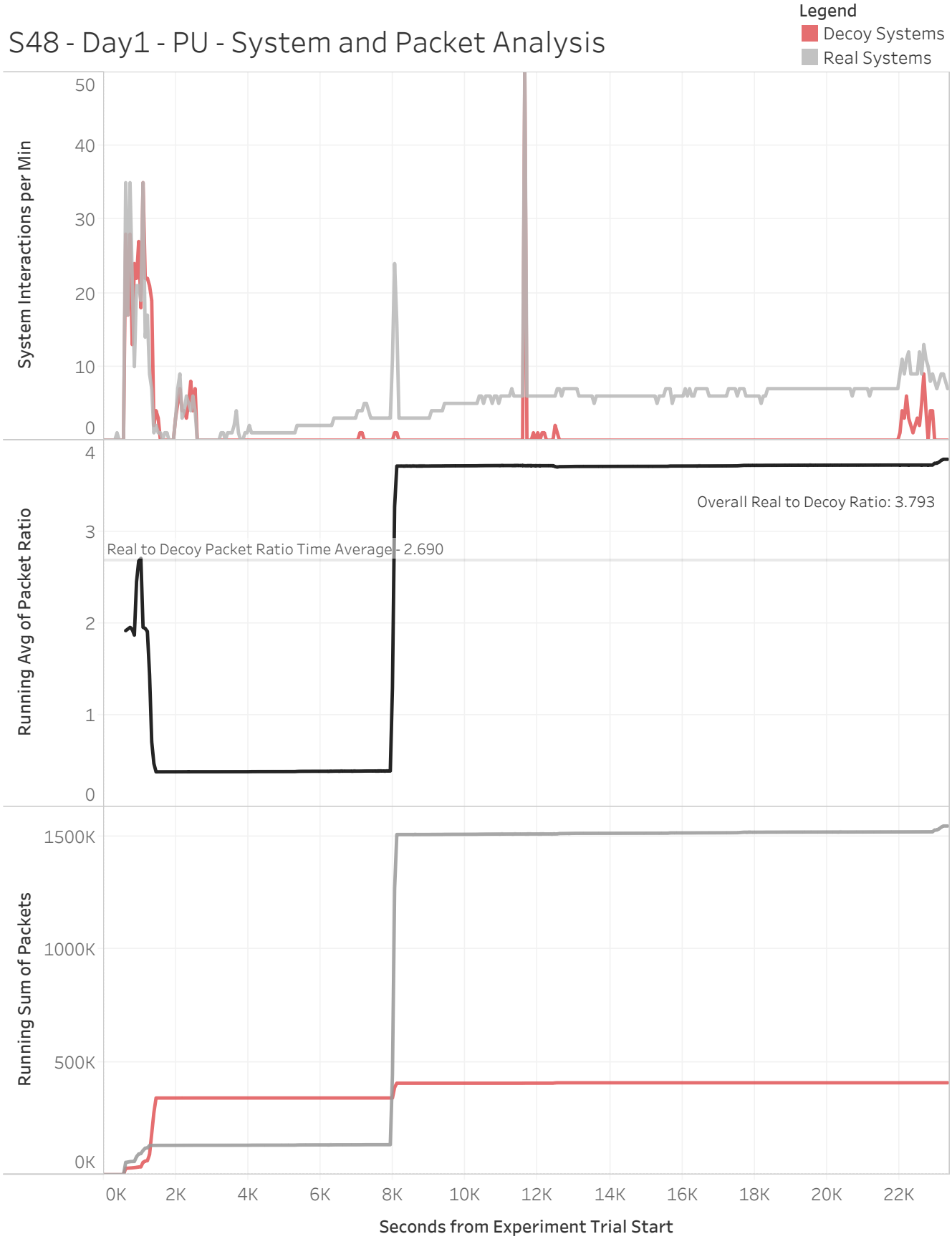


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

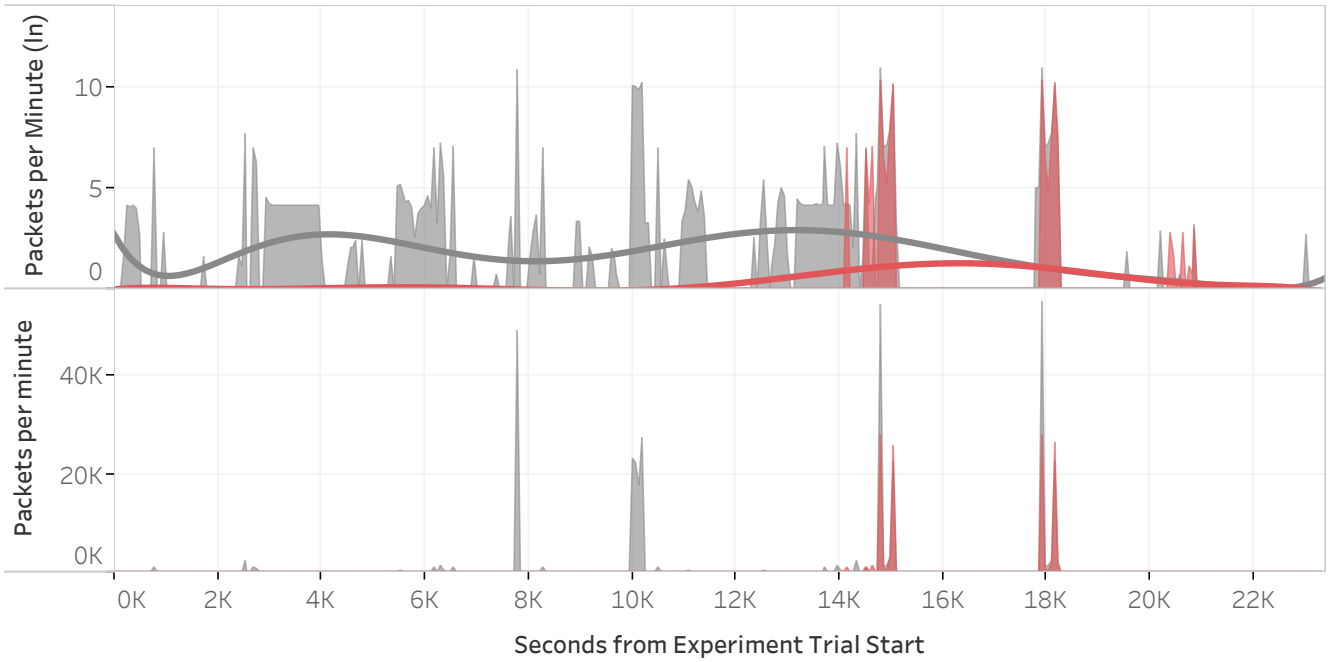



S48 - Day1 - PU - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
4
3
2
1
0
Overall Real to Decoy Ratio: 3.793
Real to Decoy Packet Ratio Time Average - 2.690
Running Sum of Packets
1500K
1000K
500K
0K
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

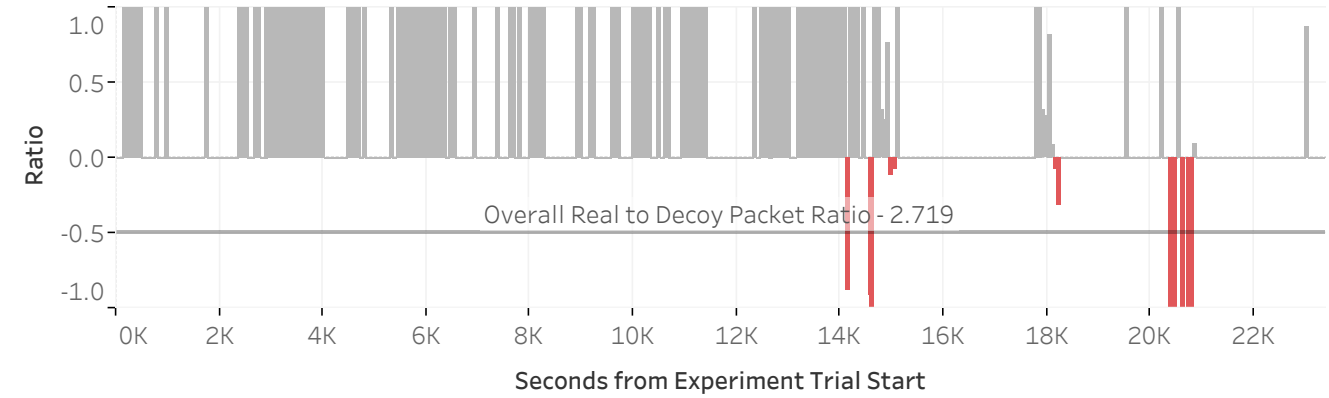
S49 - Day1 - PU

Legend
Real Systems
Decoy Systems

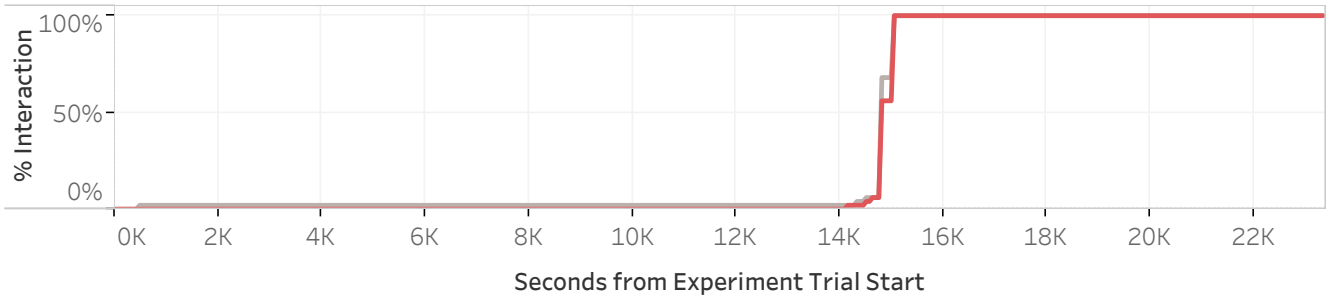
Real & Decoy Packets per Minute

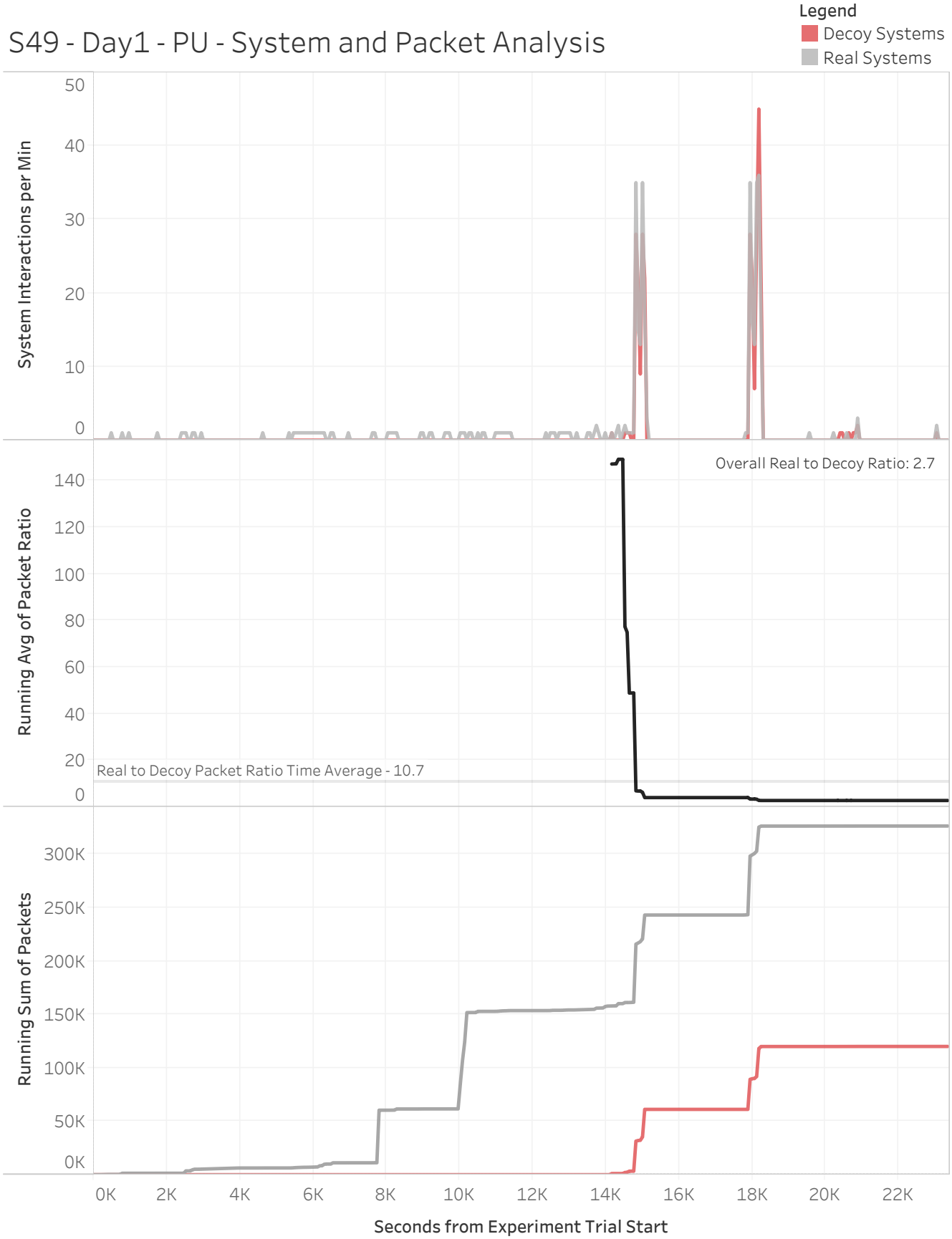


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

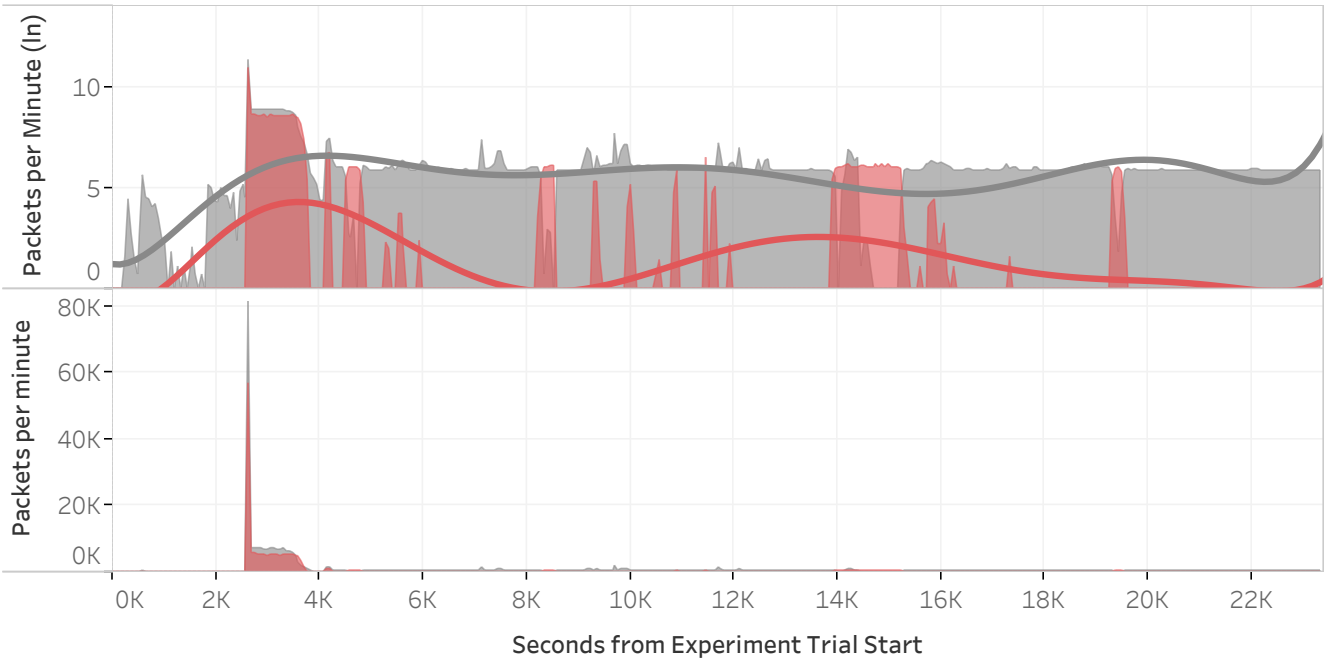



S49 - Day1 - PU - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
140
120
100
80
60
40
20
0
Overall Real to Decoy Ratio: 2.7
Real to Decoy Packet Ratio Time Average - 10.7
Running Sum of Packets
300K
250K
200K
150K
100K
50K
0K
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

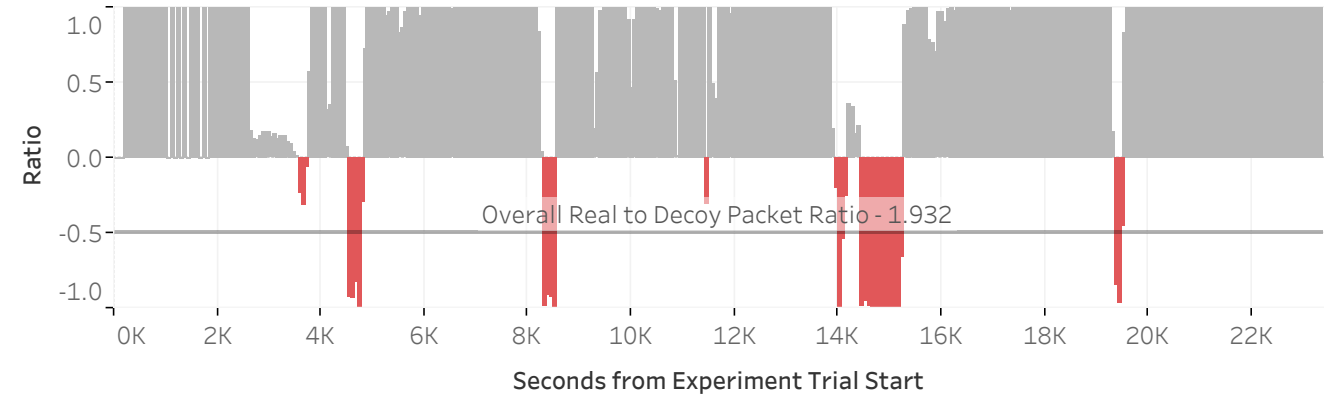
S50 - Day1 - PU

Legend
Real Systems
Decoy Systems

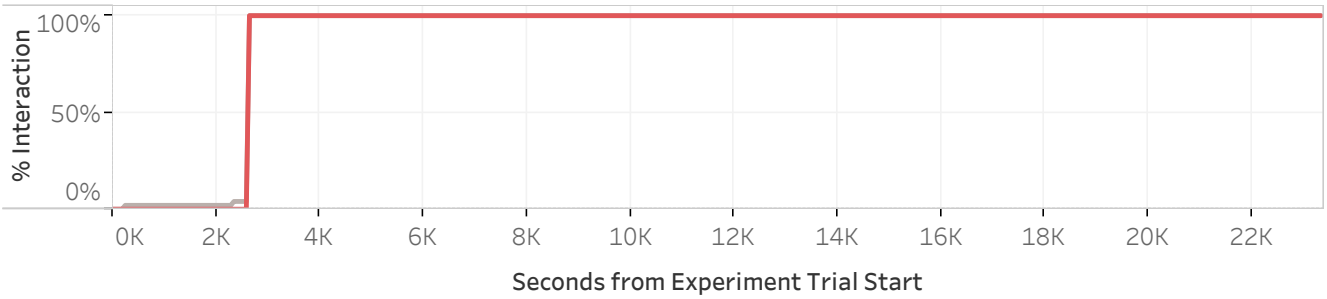
Real & Decoy Packets per Minute

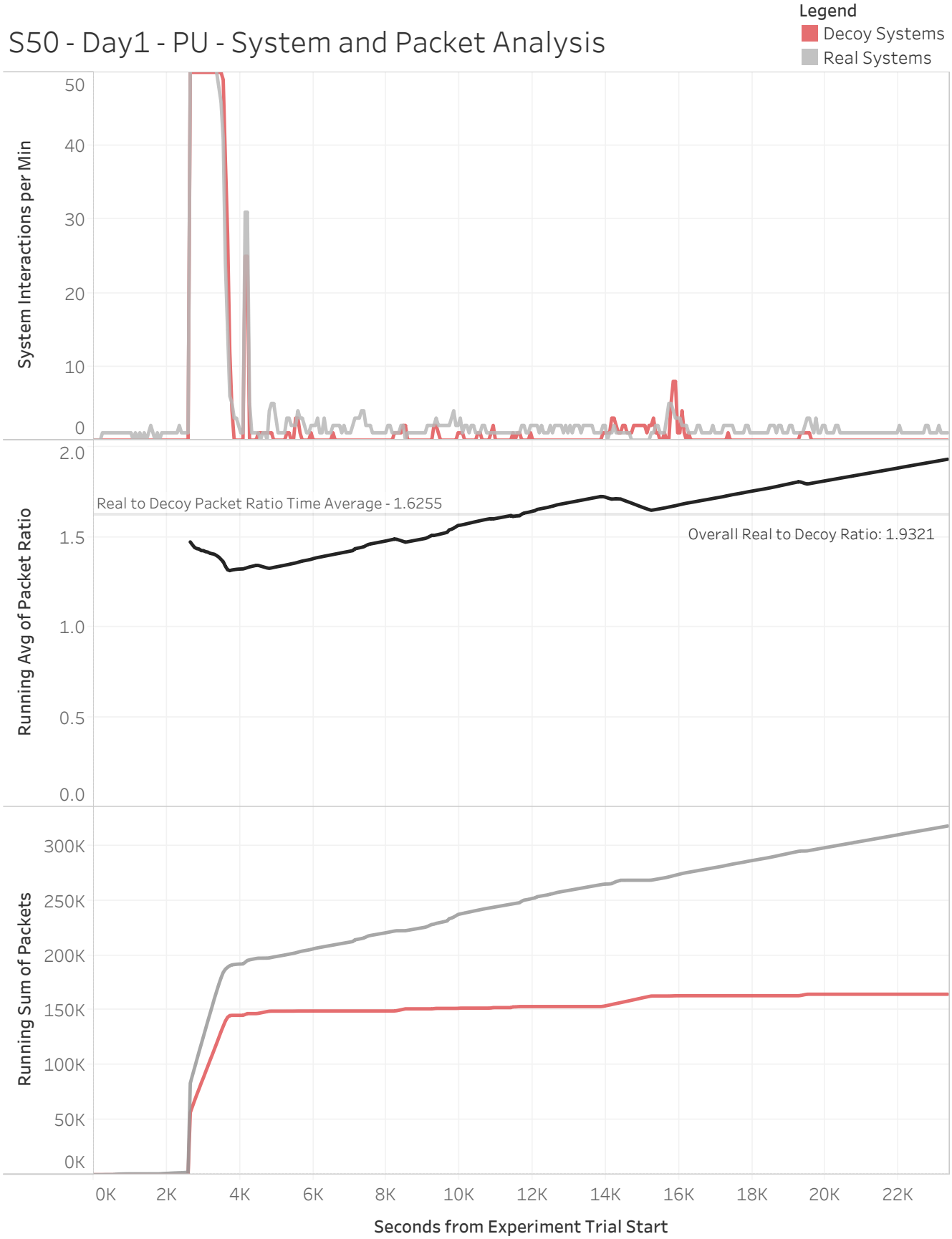


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

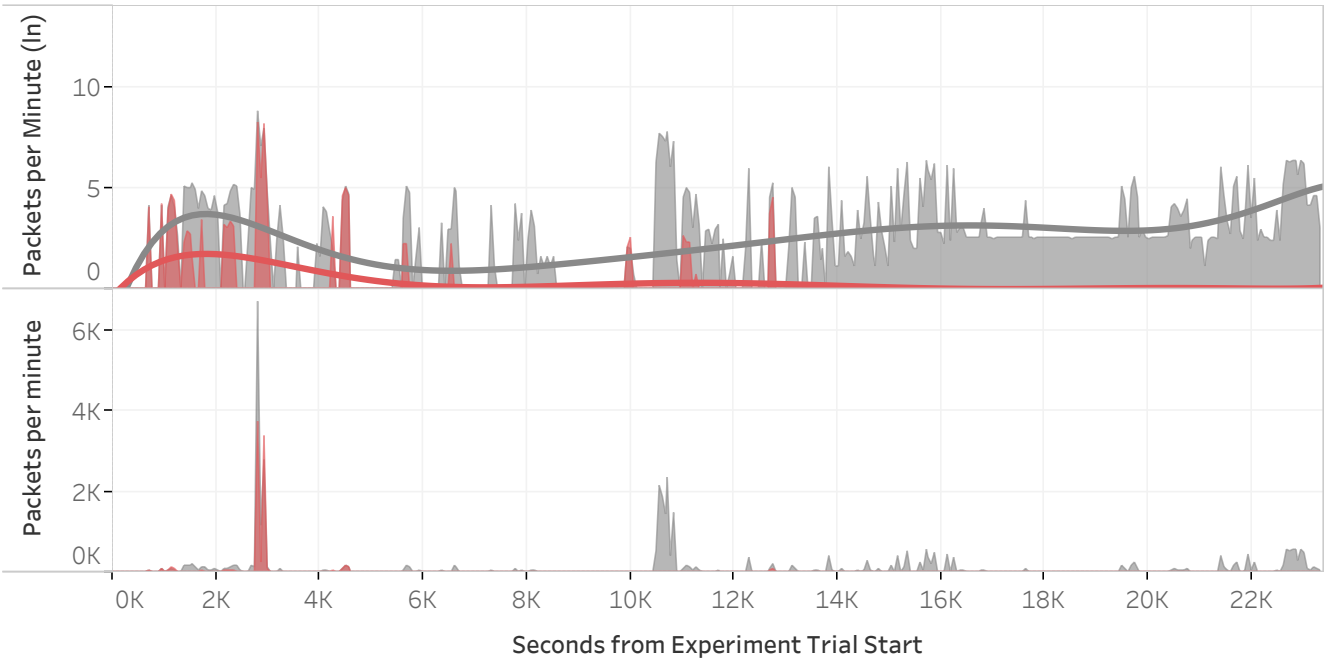



S50 - Day1 - PU - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
2.0
1.5
1.0
0.5
0.0
Real to Decoy Packet Ratio Time Average - 1.6255
Overall Real to Decoy Ratio: 1.9321
Running Sum of Packets
300K
250K
200K
150K
100K
50K
0K
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

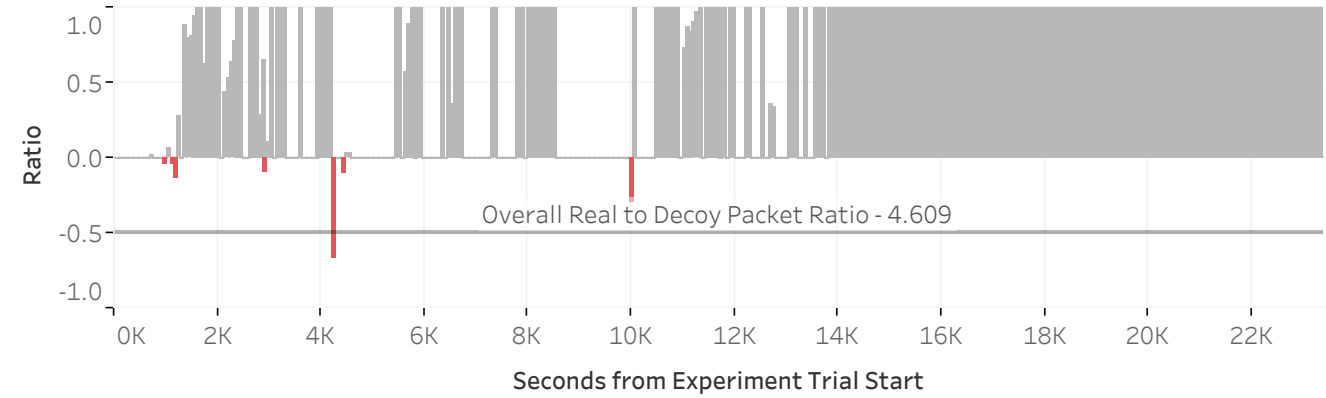
S51 - Day1 - PU

Legend
Real Systems
Decoy Systems

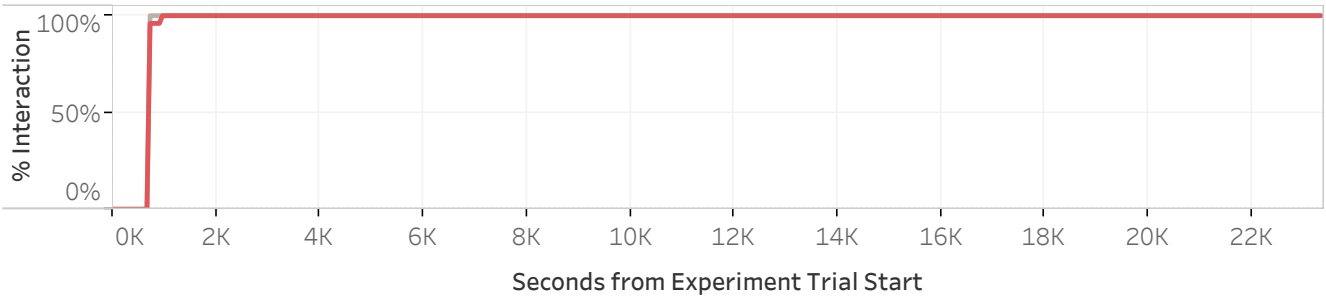
Real & Decoy Packets per Minute

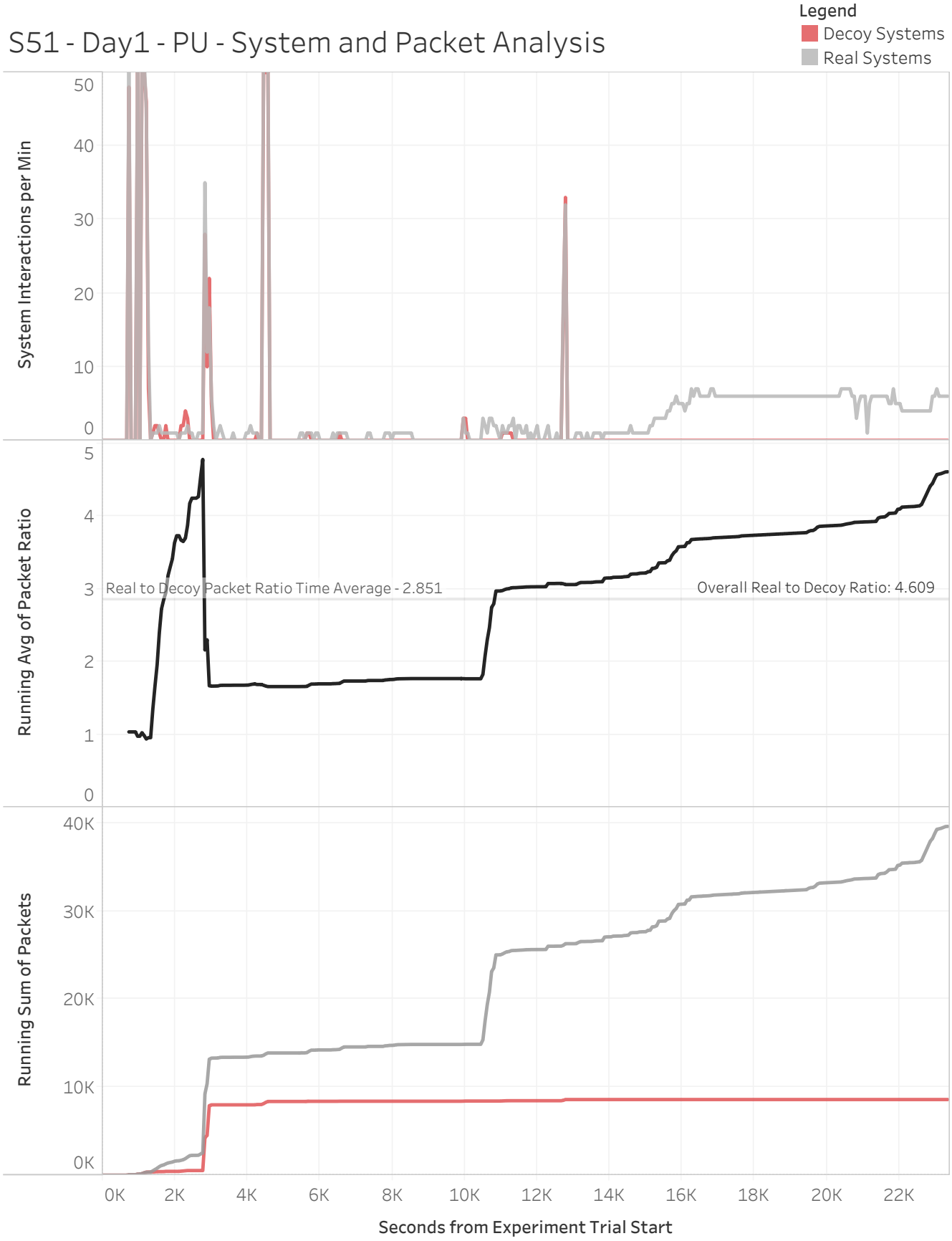


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

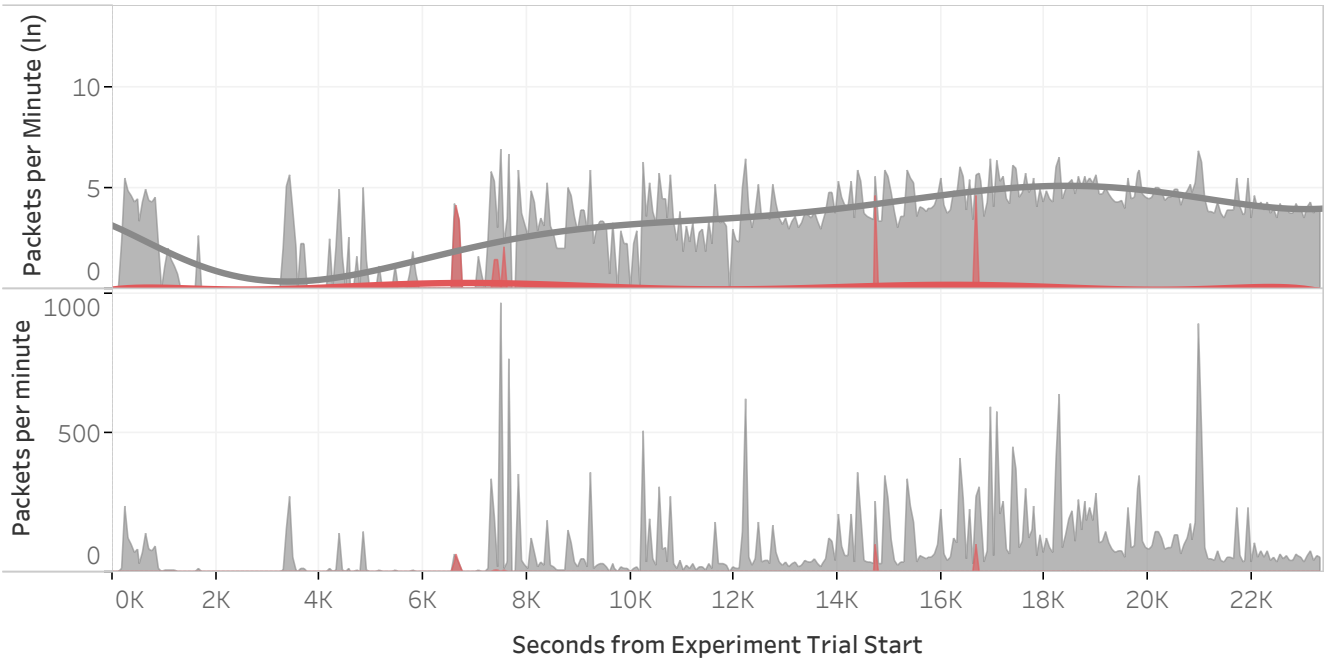



S51 - Day1 - PU - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
5
4
3
2
1
0
Real to Decoy Packet Ratio Time Average - 2.851
Overall Real to Decoy Ratio: 4.609
Running Sum of Packets
40K
30K
20K
10K
0K
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

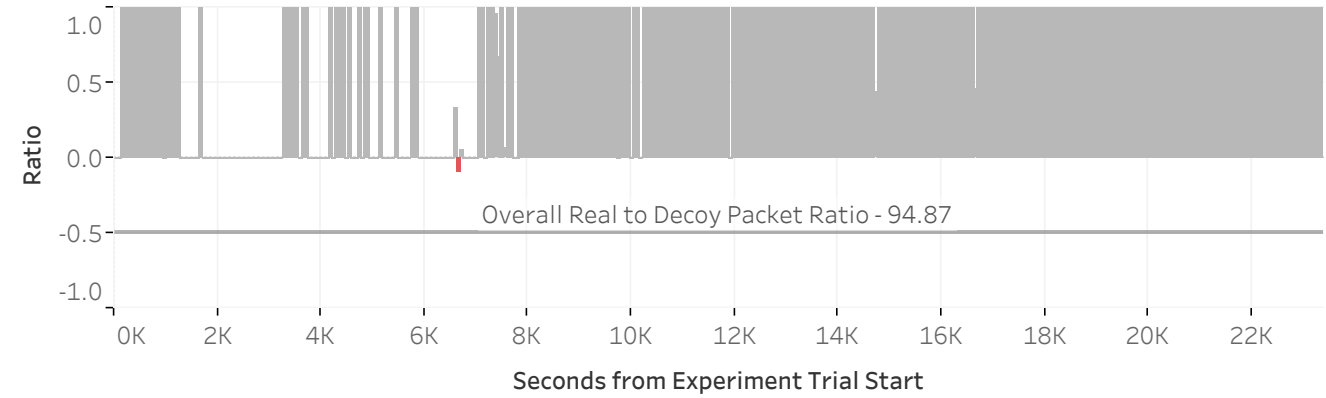
S52 - Day1 - PU

Legend
Real Systems
Decoy Systems

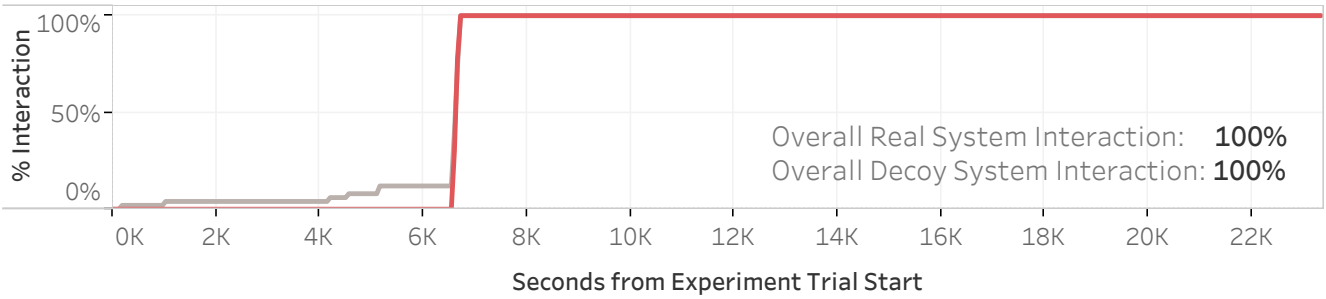
Real & Decoy Packets per Minute

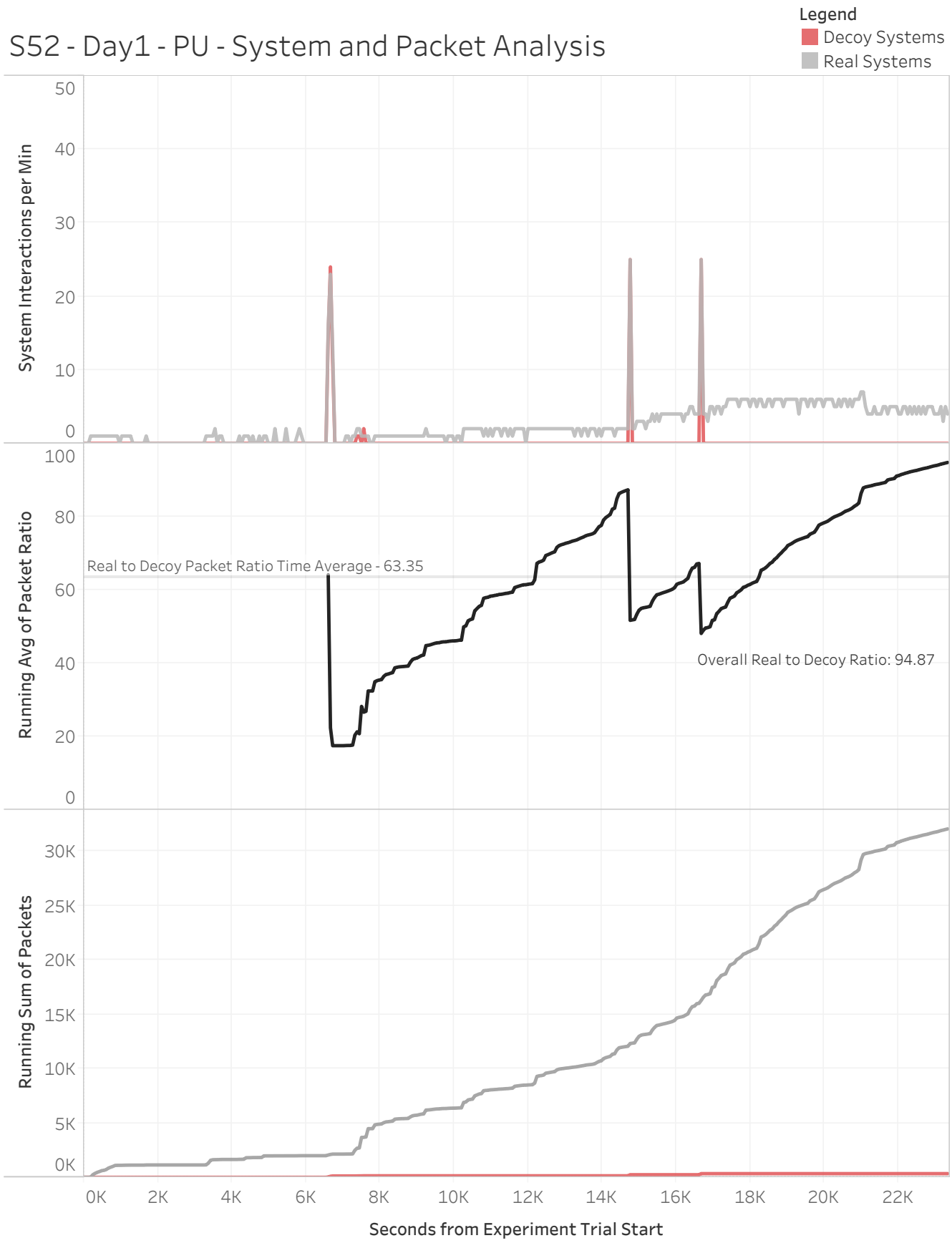


Real to Decoy Packet Ratio

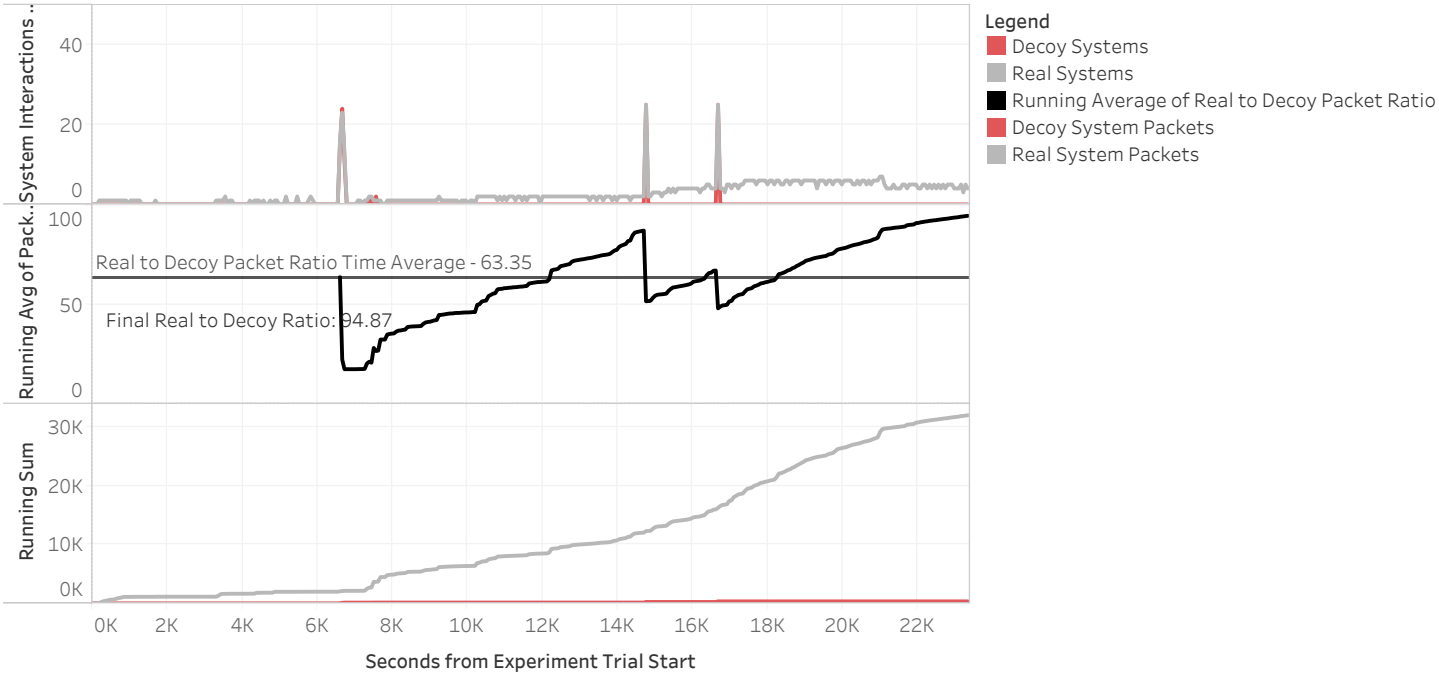


Real & Decoy System Interaction Timeline




S52 - Day1 - PU - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
100
80
60
40
20
0
Real to Decoy Packet Ratio Time Average - 63.35
Overall Real to Decoy Ratio: 94.87
Running Sum of Packets
30K
25K
20K
15K
10K
5K
0K
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

S52 - Day1 - PU - System Interaction and Packet Analysis

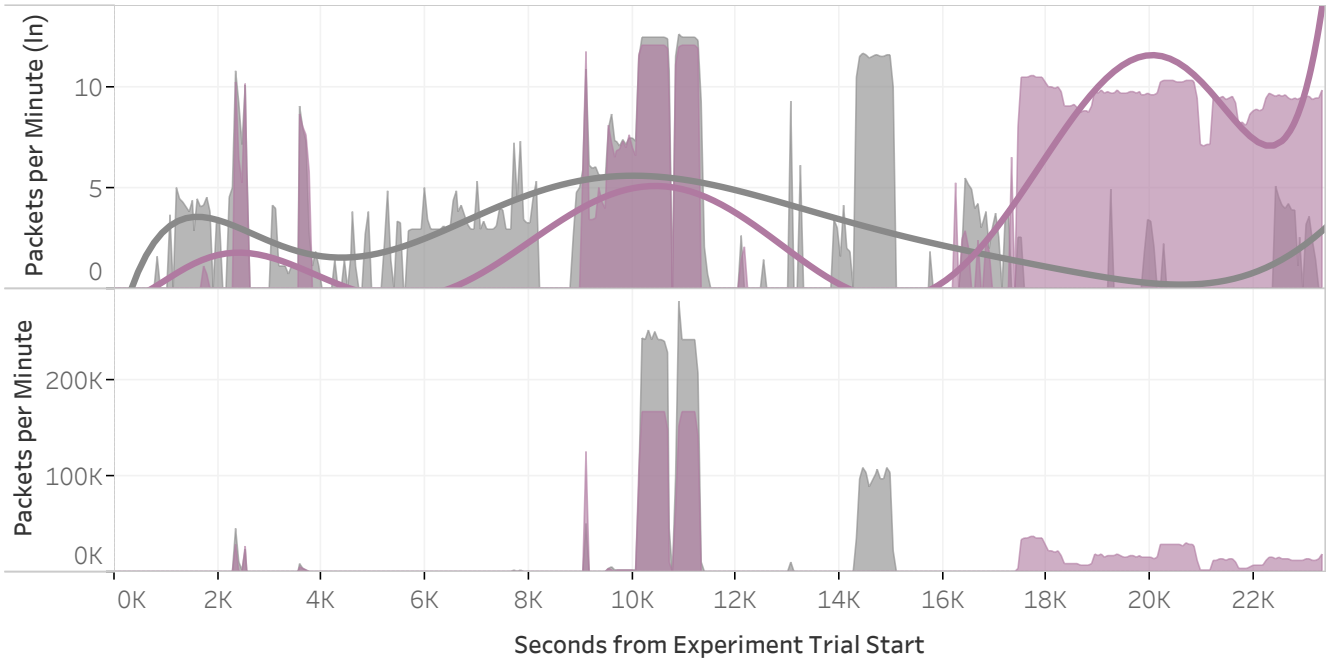


The trends of Decoy Systems, Real Systems, Running Average of Real to Decoy Packet Ratio, Decoy System Packets and Real System Packets for Start. Color shows details about Decoy Systems, Real Systems, Running Average of Real to Decoy Packet Ratio, Decoy System Packets and Real System Packets.

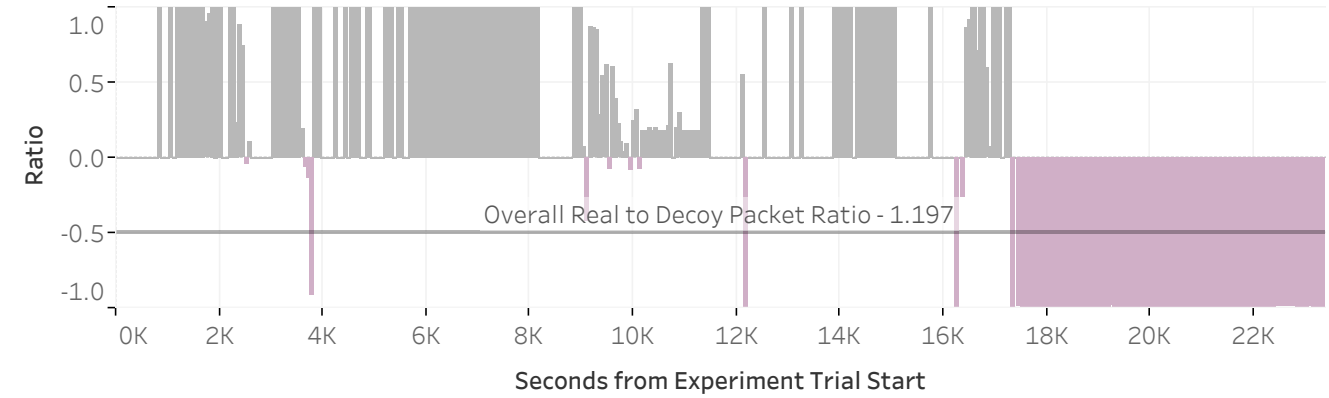
S53 - Day1 - PI

Legend
Real Systems
Decoy Systems

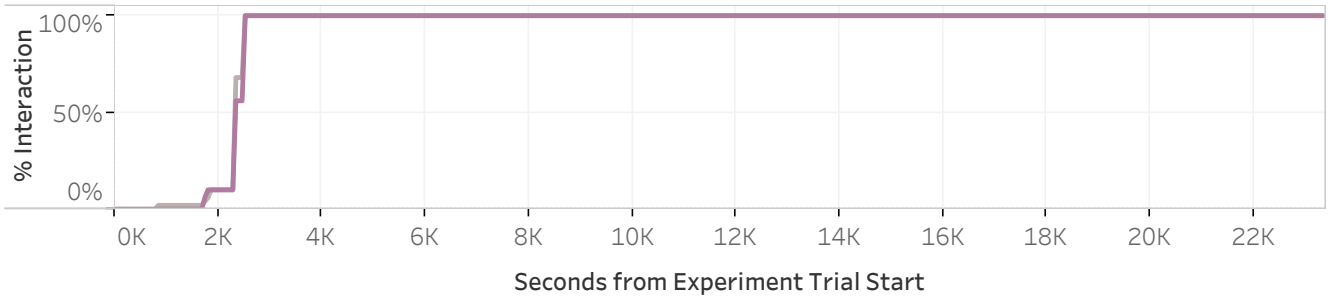
Real & Decoy Packets per Minute

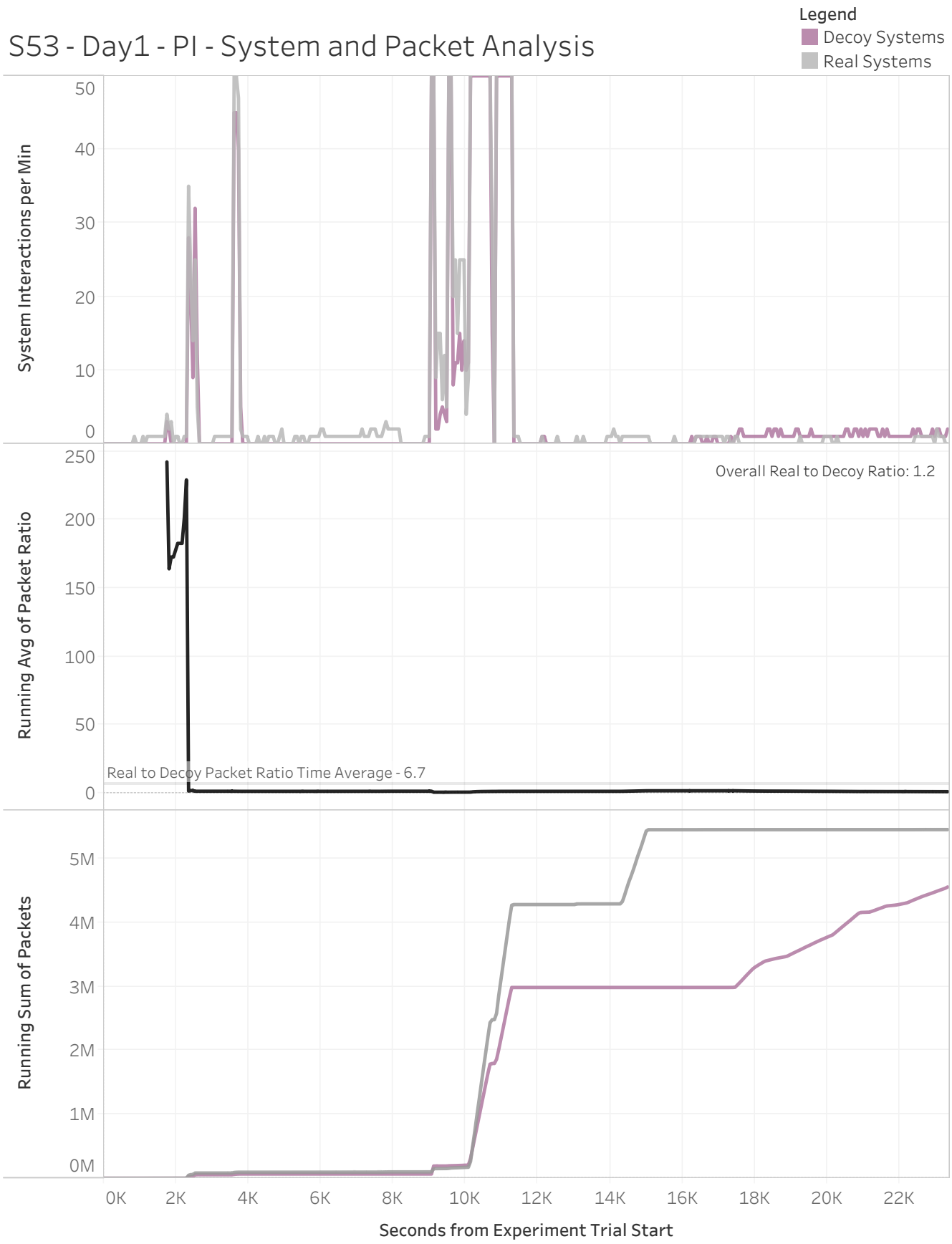


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

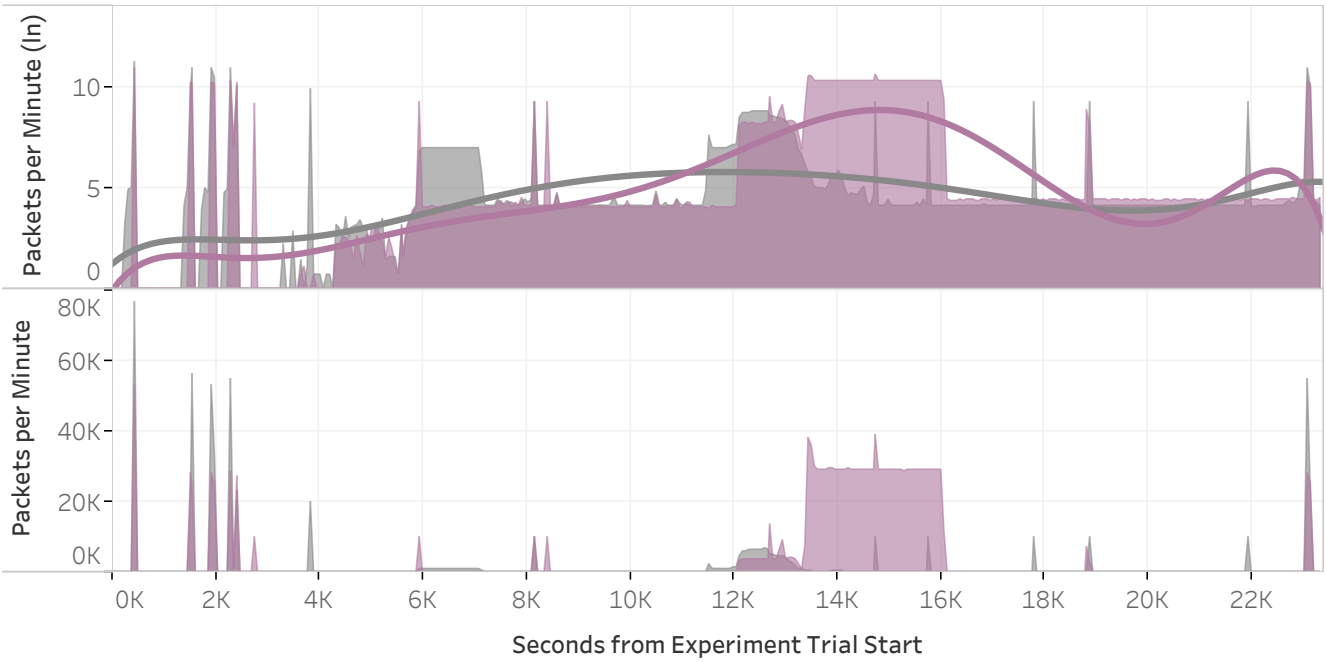



S53 - Day1 - PI - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
250
200
150
100
50
0
Overall Real to Decoy Ratio: 1.2
Real to Decoy Packet Ratio Time Average - 6.7
Running Sum of Packets
5M
4M
3M
2M
1M
0M
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

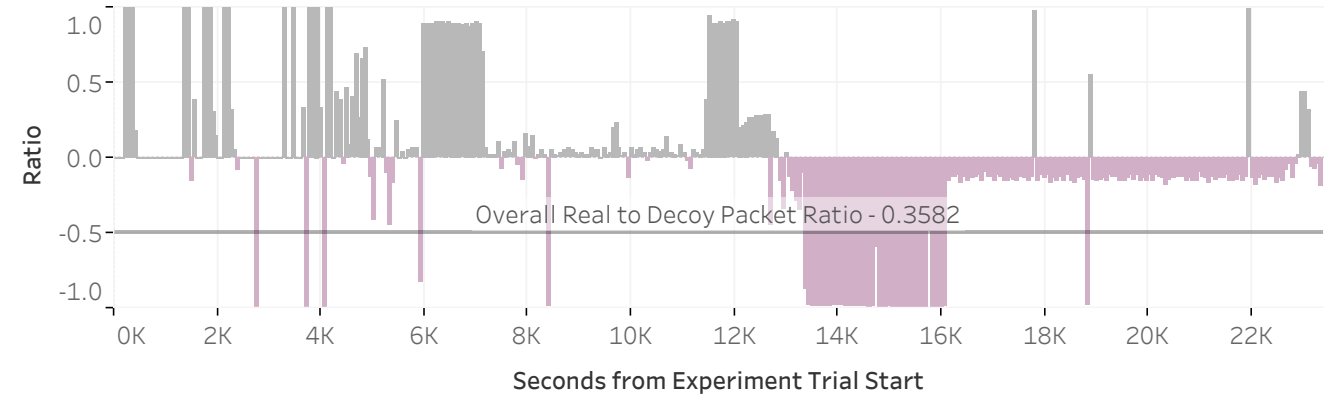
S54 - Day1 - PI

Legend
Real Systems
Decoy Systems

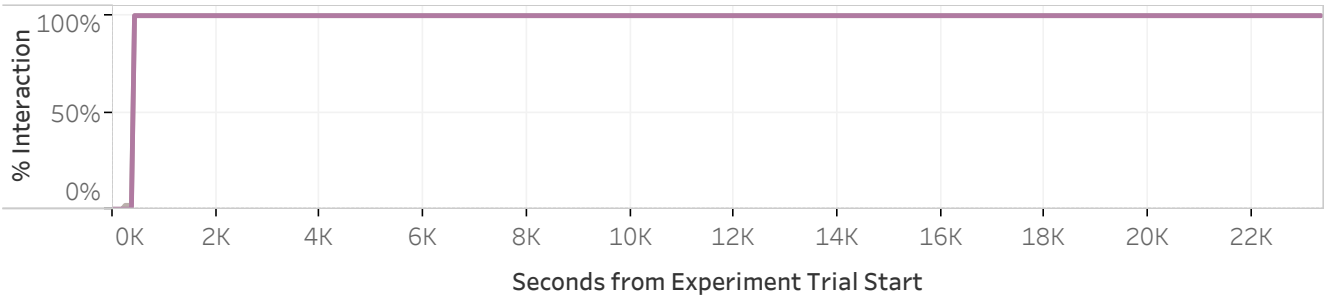
Real & Decoy Packets per Minute

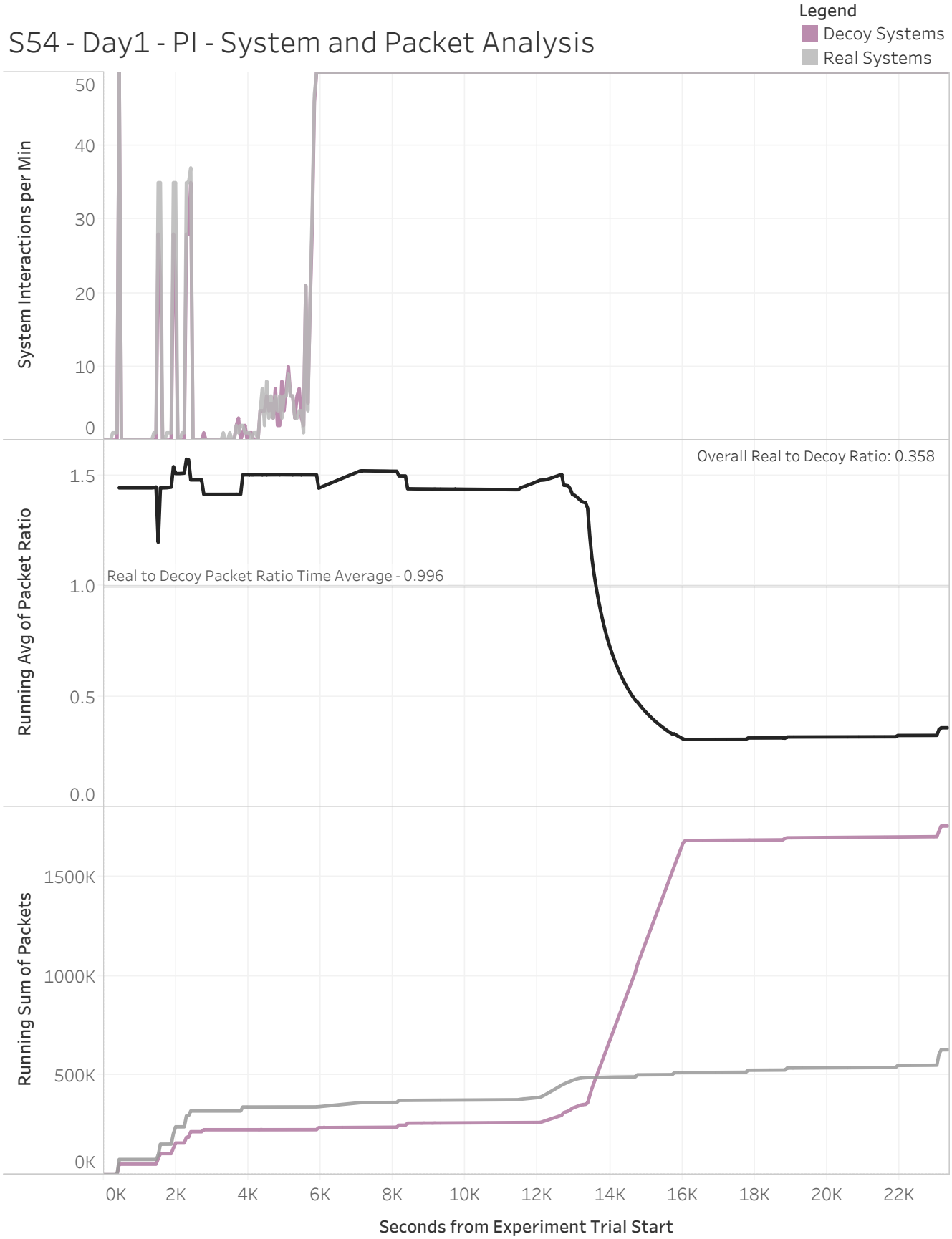


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

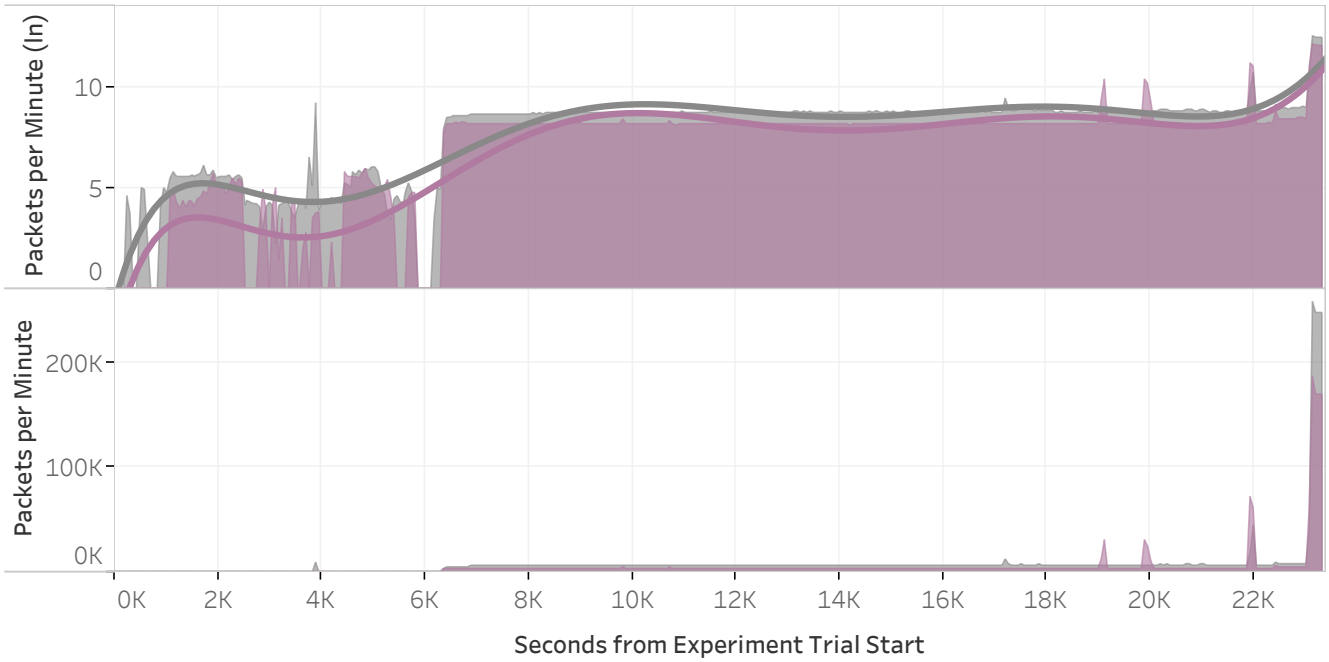



S54 - Day1 - PI - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
1.5
1.0
0.5
0.0
Overall Real to Decoy Ratio: 0.358
Real to Decoy Packet Ratio Time Average - 0.996
Running Sum of Packets
1500K
1000K
500K
0K
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

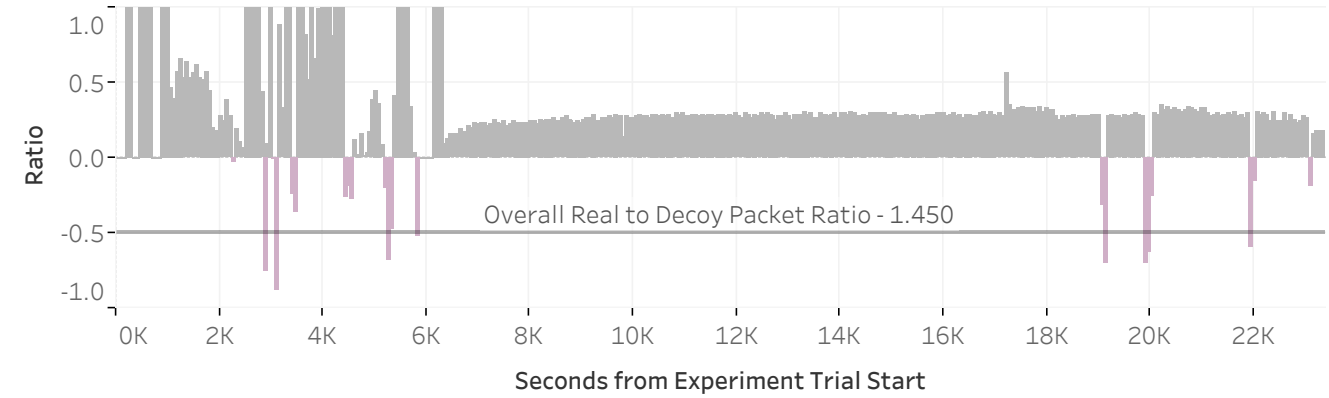
S55 - Day1 - PI

Legend
Real Systems
Decoy Systems

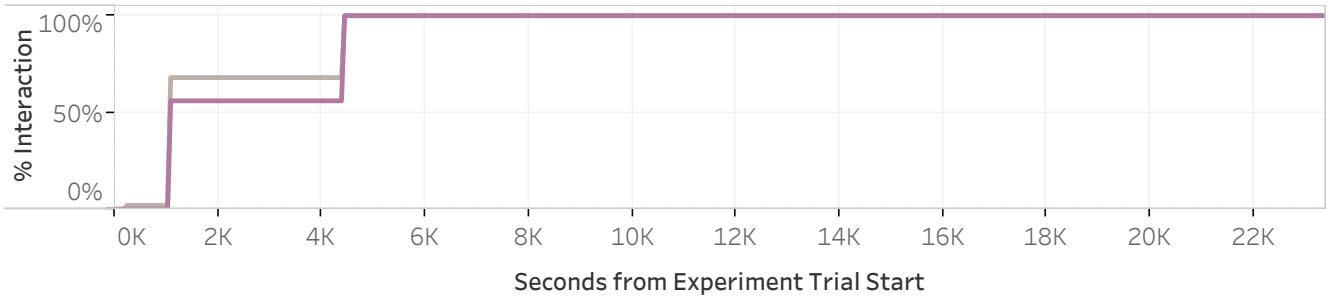
Real & Decoy Packets per Minute

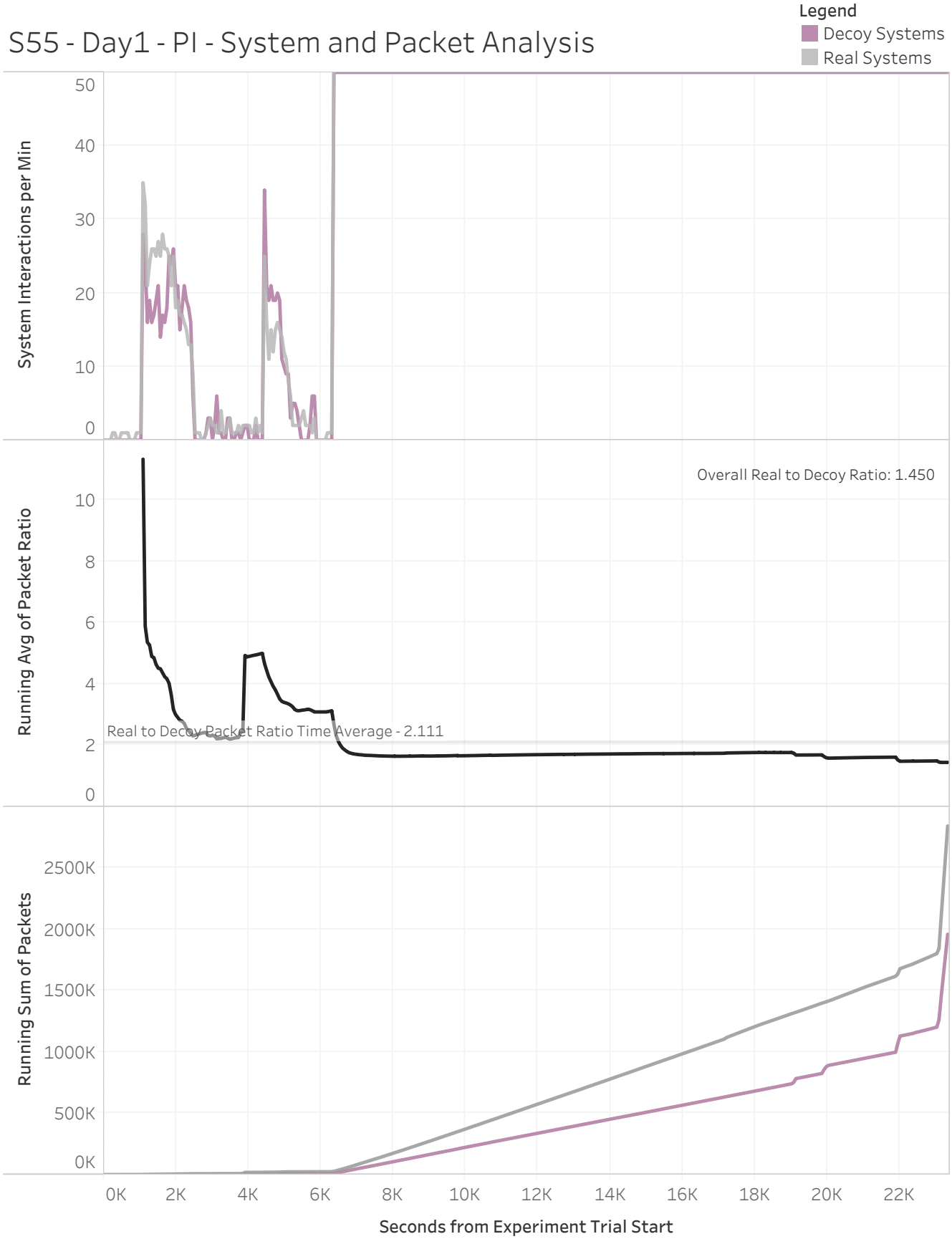


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

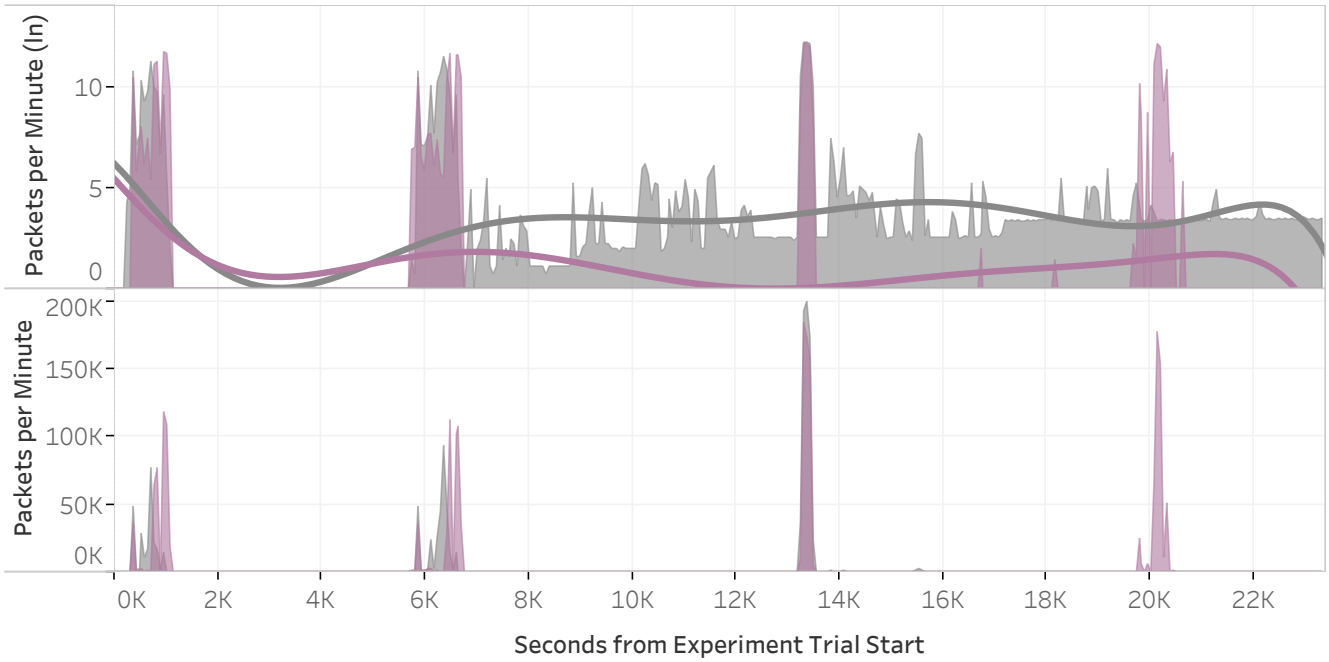



S55 - Day1 - PI - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
10
8
6
4
2
0
Overall Real to Decoy Ratio: 1.450
Real to Decoy Packet Ratio Time Average - 2.111
Running Sum of Packets
2500K
2000K
1500K
1000K
500K
0K
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

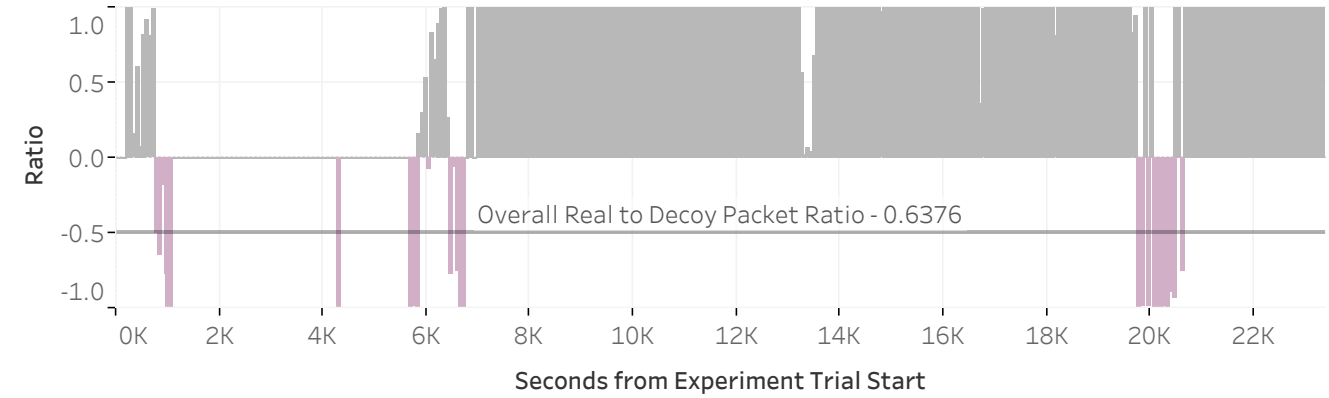
S56 - Day1 - PI

Legend
Real Systems
Decoy Systems

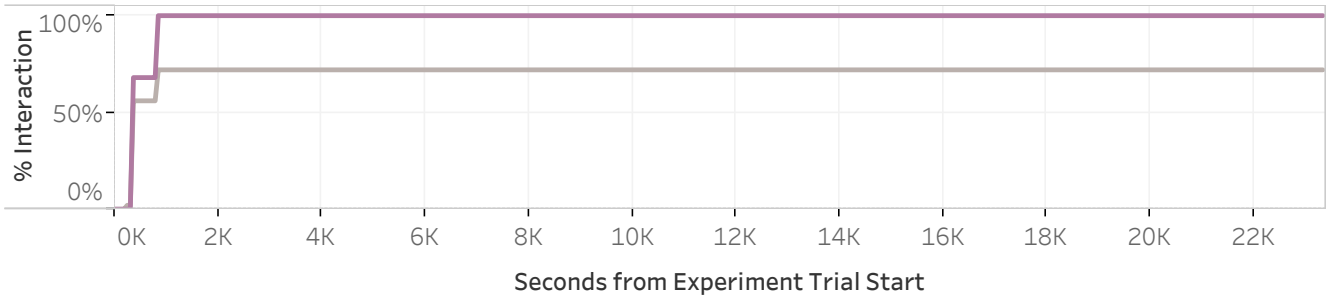
Real & Decoy Packets per Minute

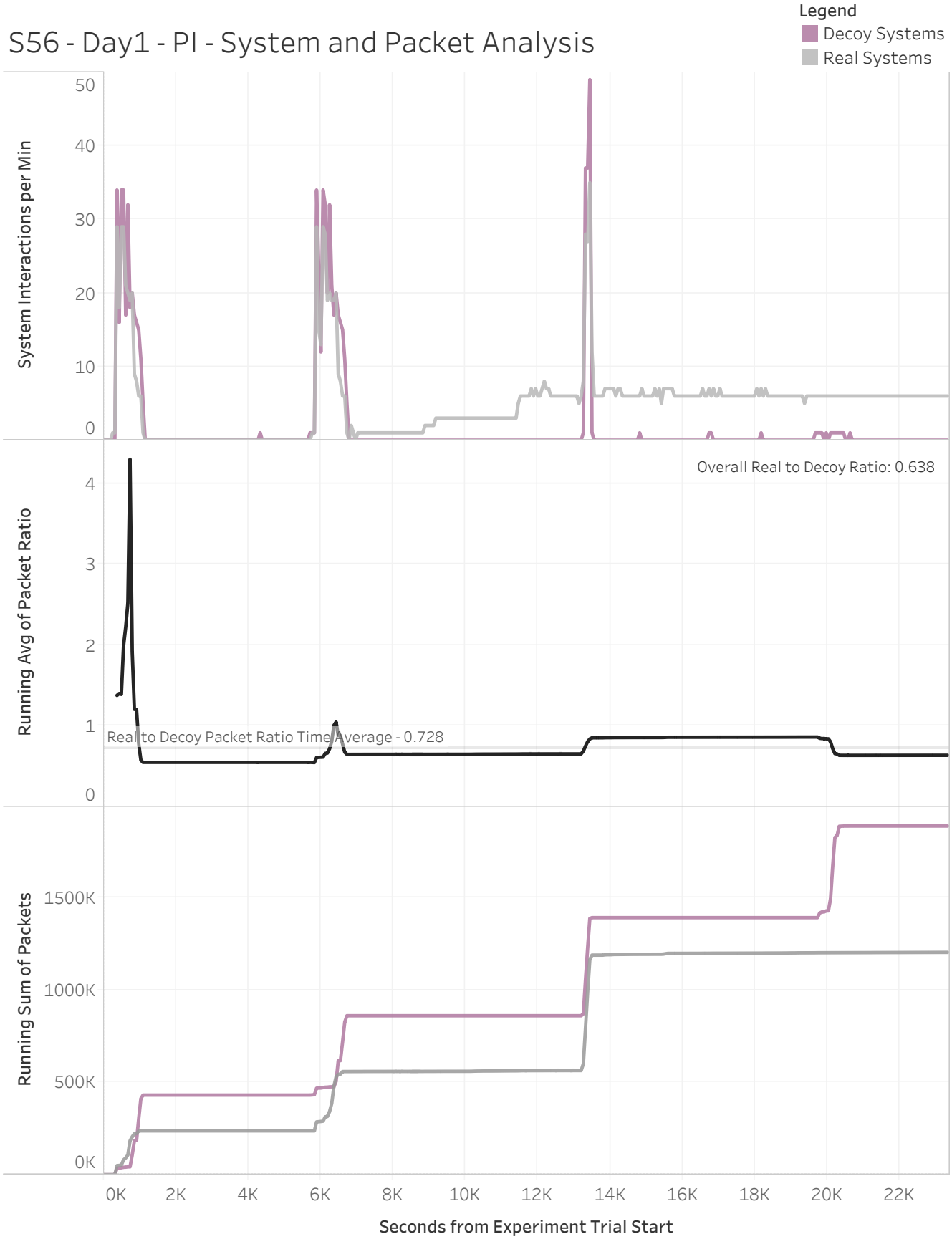


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

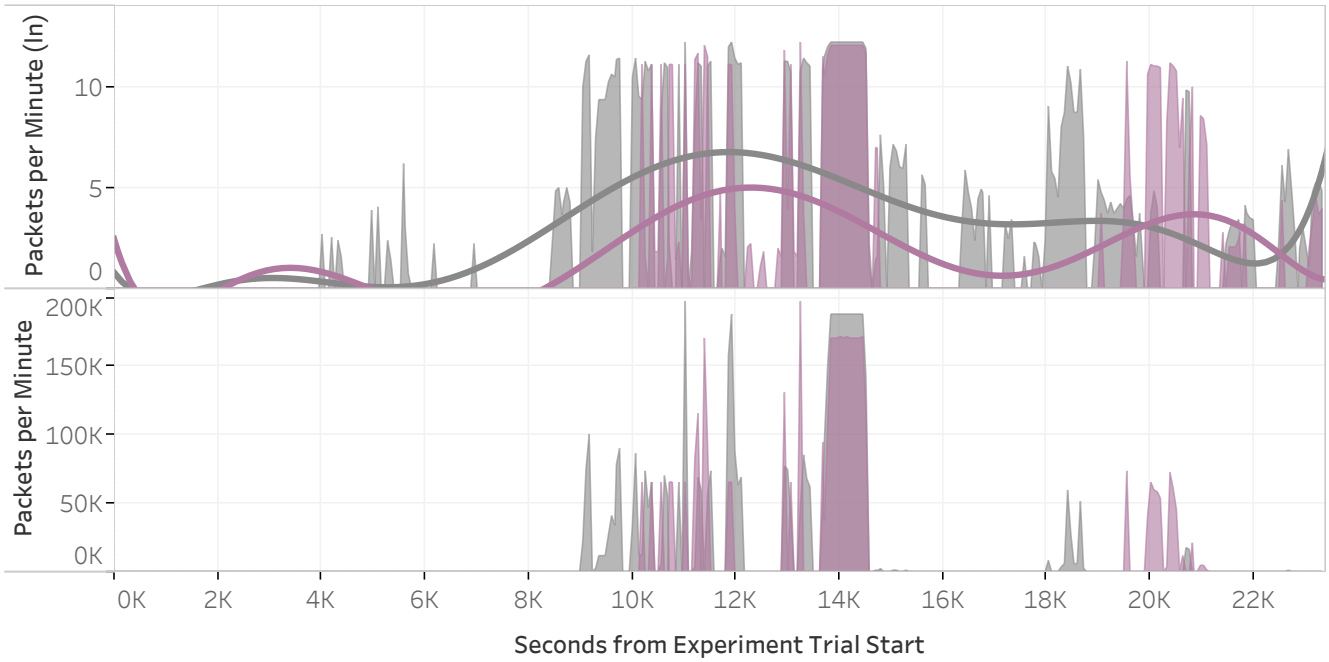



S56 - Day1 - PI - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
4
3
2
1
0
Overall Real to Decoy Ratio: 0.638
Real to Decoy Packet Ratio Time Average - 0.728
Running Sum of Packets
1500K
1000K
500K
0K
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

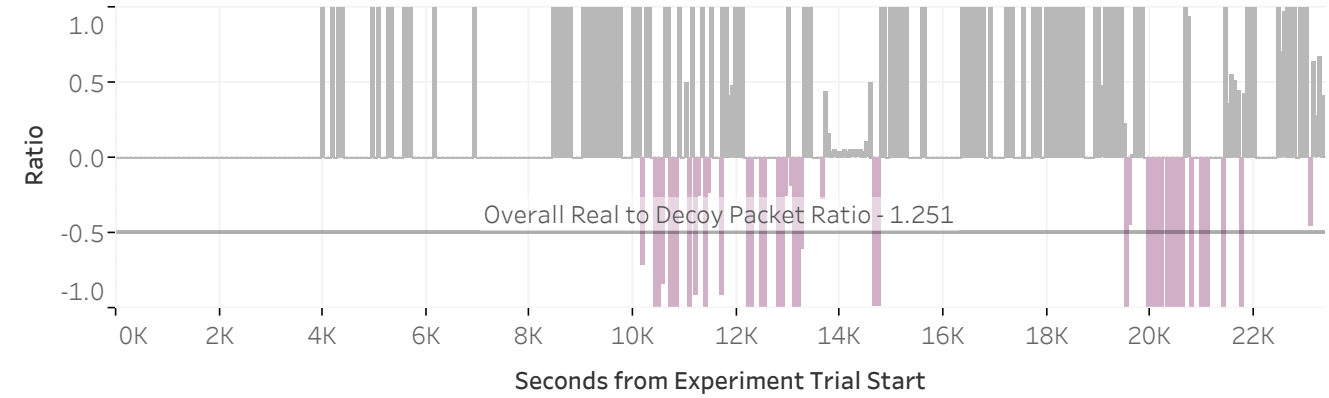
S57 - Day1 - PI

Legend
Real Systems
Decoy Systems

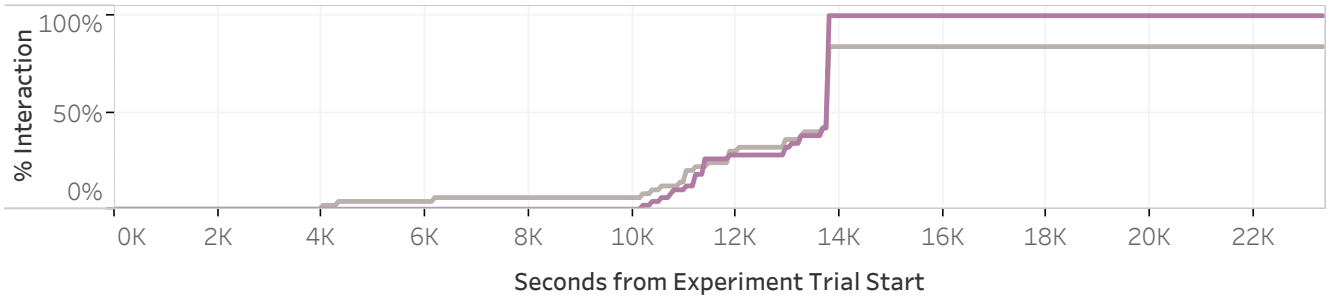
Real & Decoy Packets per Minute

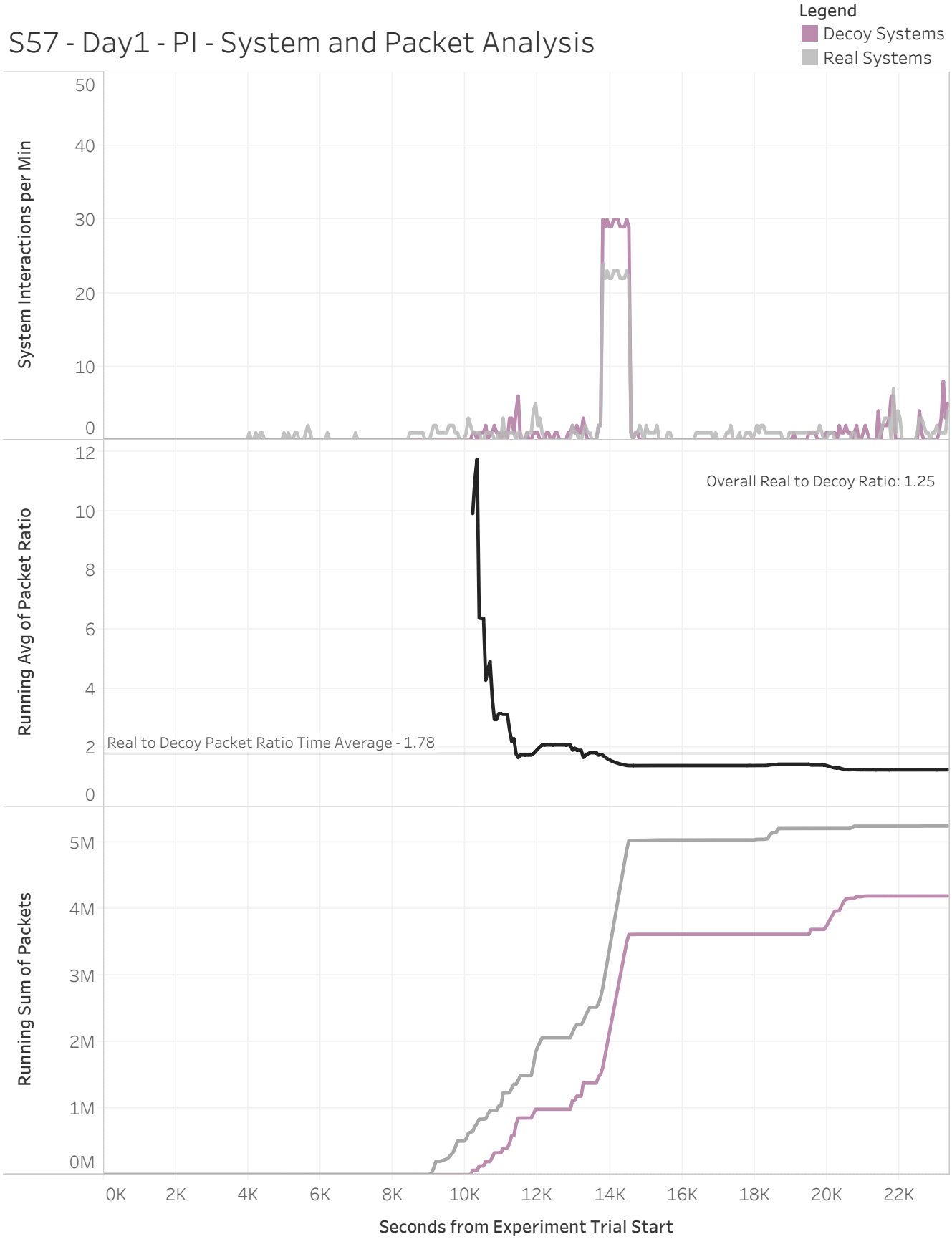


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

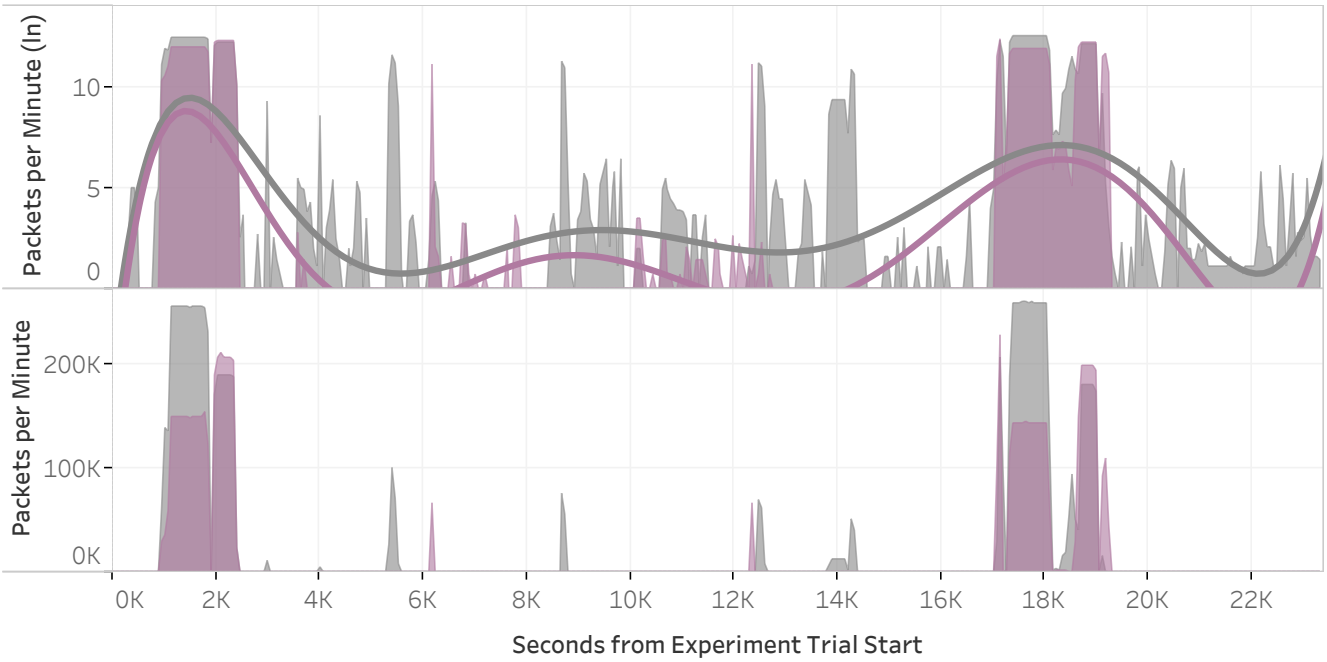



S57 - Day1 - PI - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
12
10
8
6
4
2
0
Overall Real to Decoy Ratio: 1.25
Real to Decoy Packet Ratio Time Average - 1.78
Running Sum of Packets
5M
4M
3M
2M
1M
0M
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

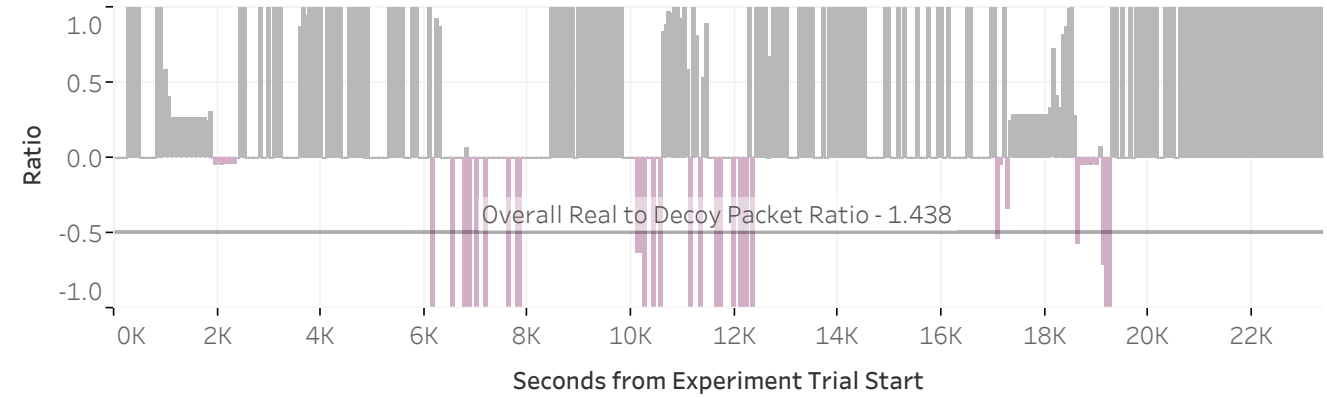
S58 - Day1 - PI

Legend
Real Systems
Decoy Systems

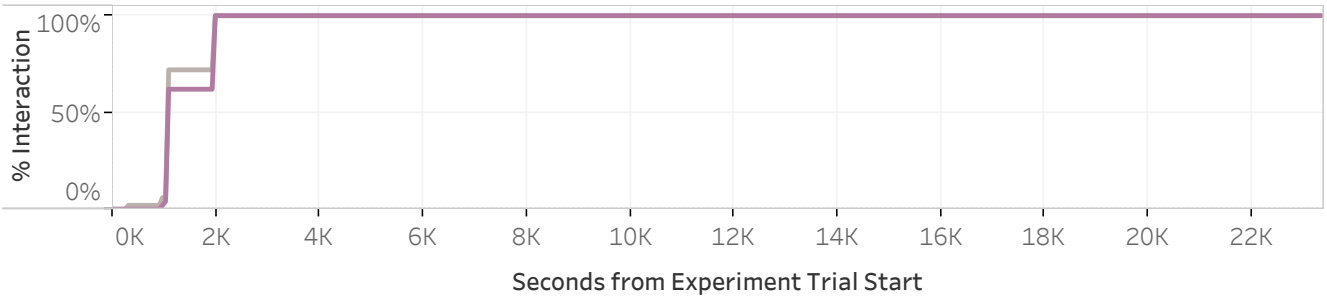
Real & Decoy Packets per Minute

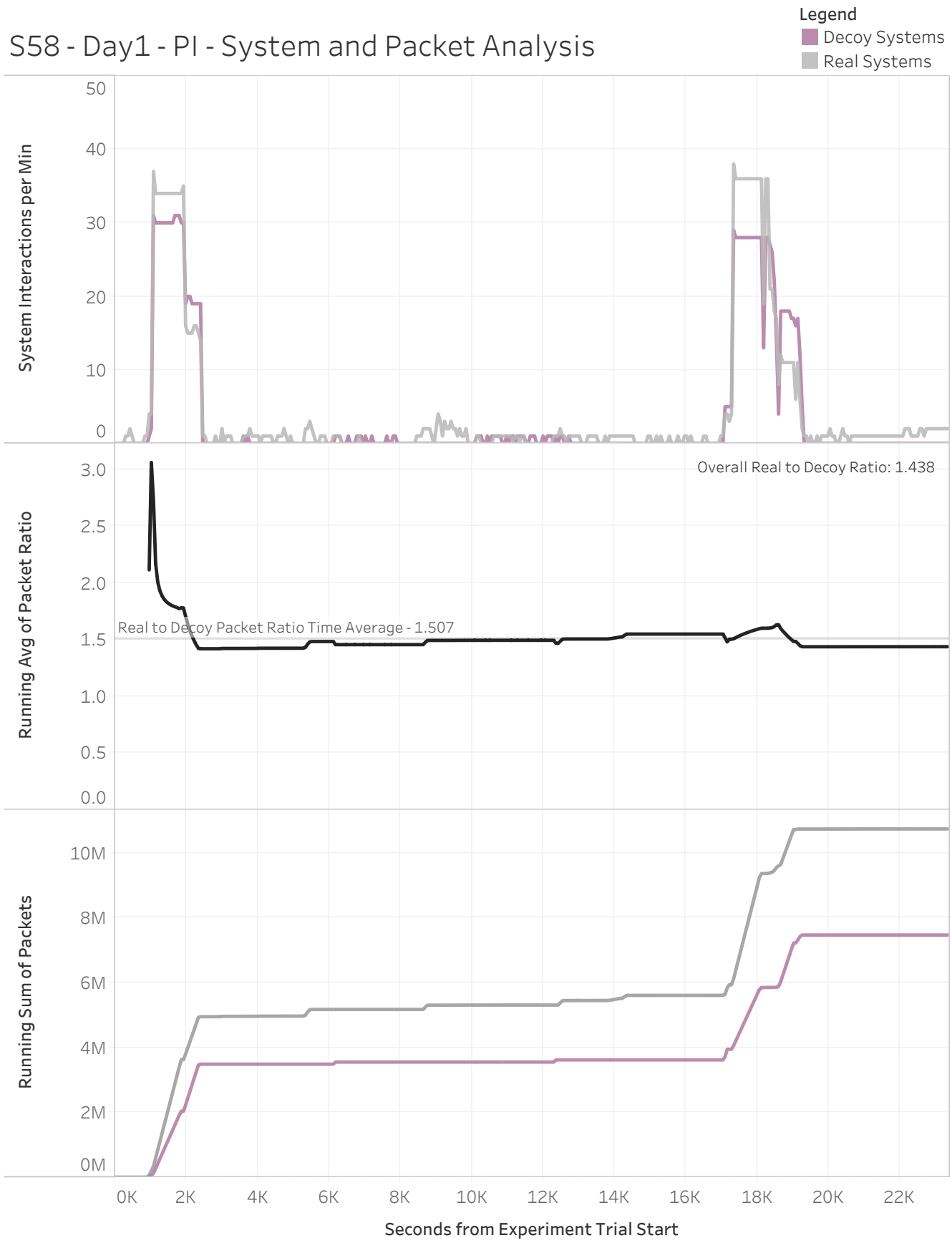


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

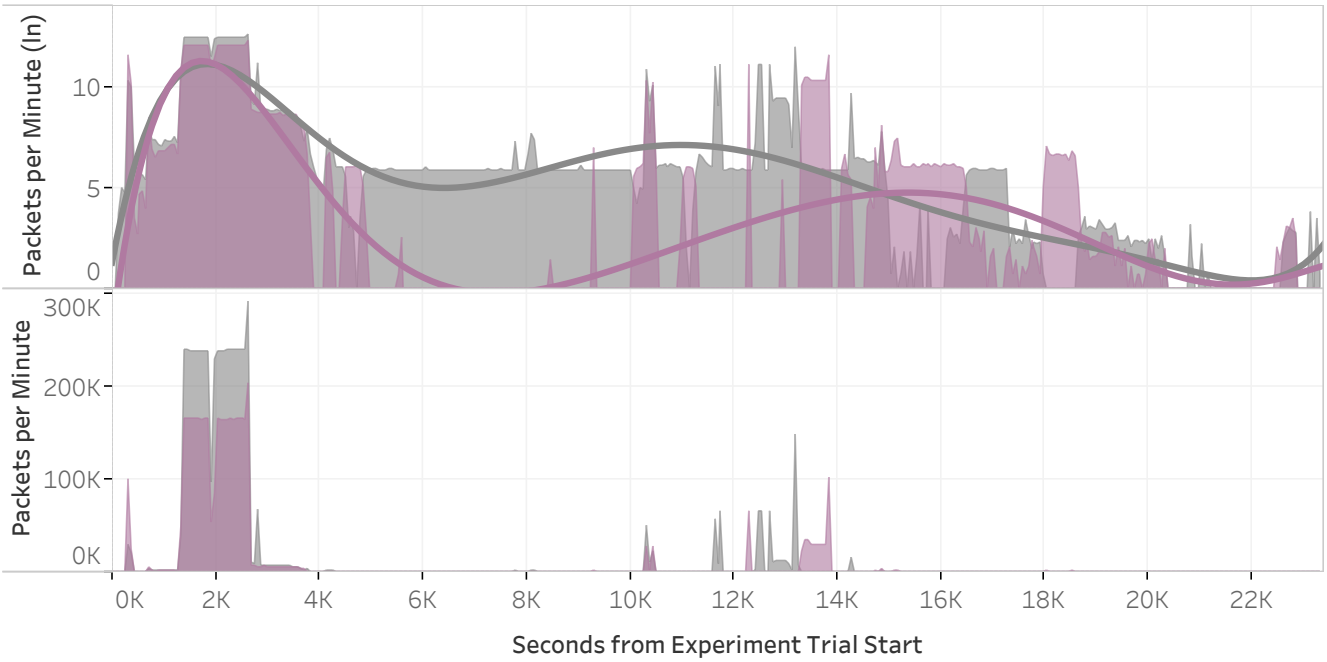



S58 - Day1 - PI - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Overall Real to Decoy Ratio: 1.438
Real to Decoy Packet Ratio Time Average - 1.507
Running Sum of Packets
10M
8M
6M
4M
2M
0M
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

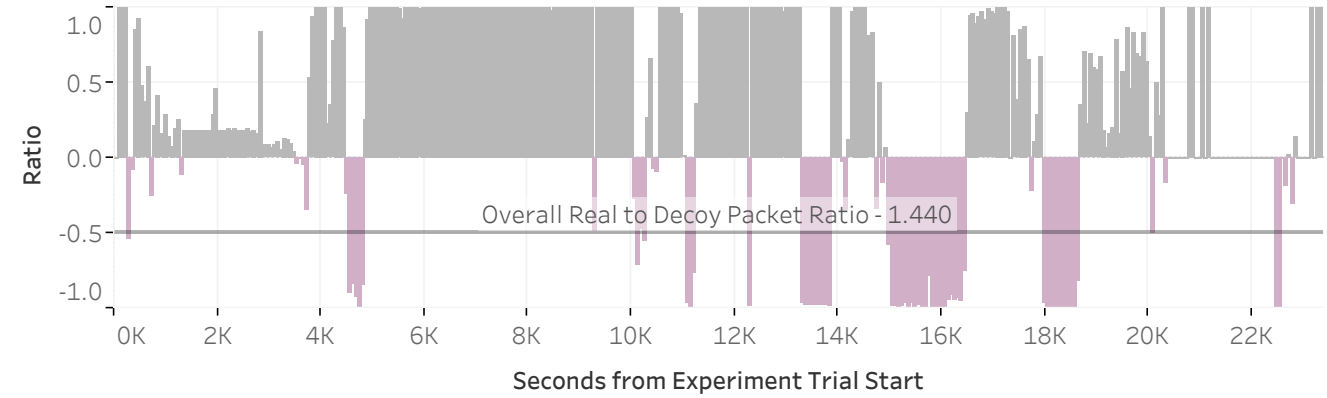
S59 - Day1 - PI

Legend
Real Systems
Decoy Systems

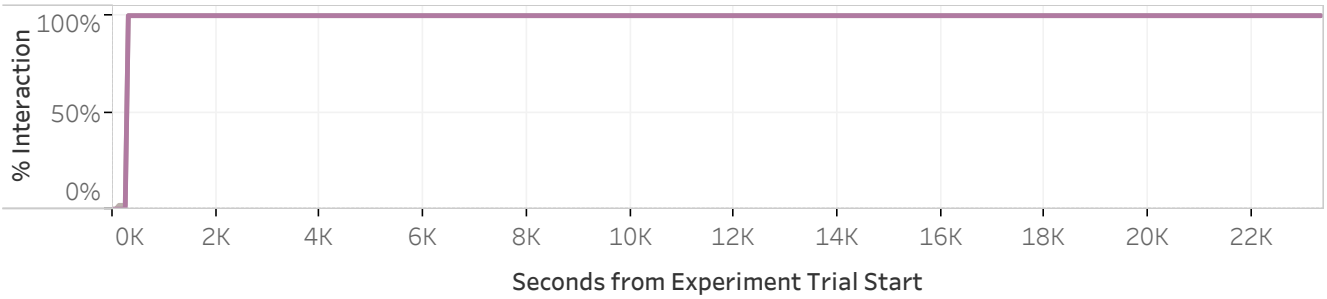
Real & Decoy Packets per Minute

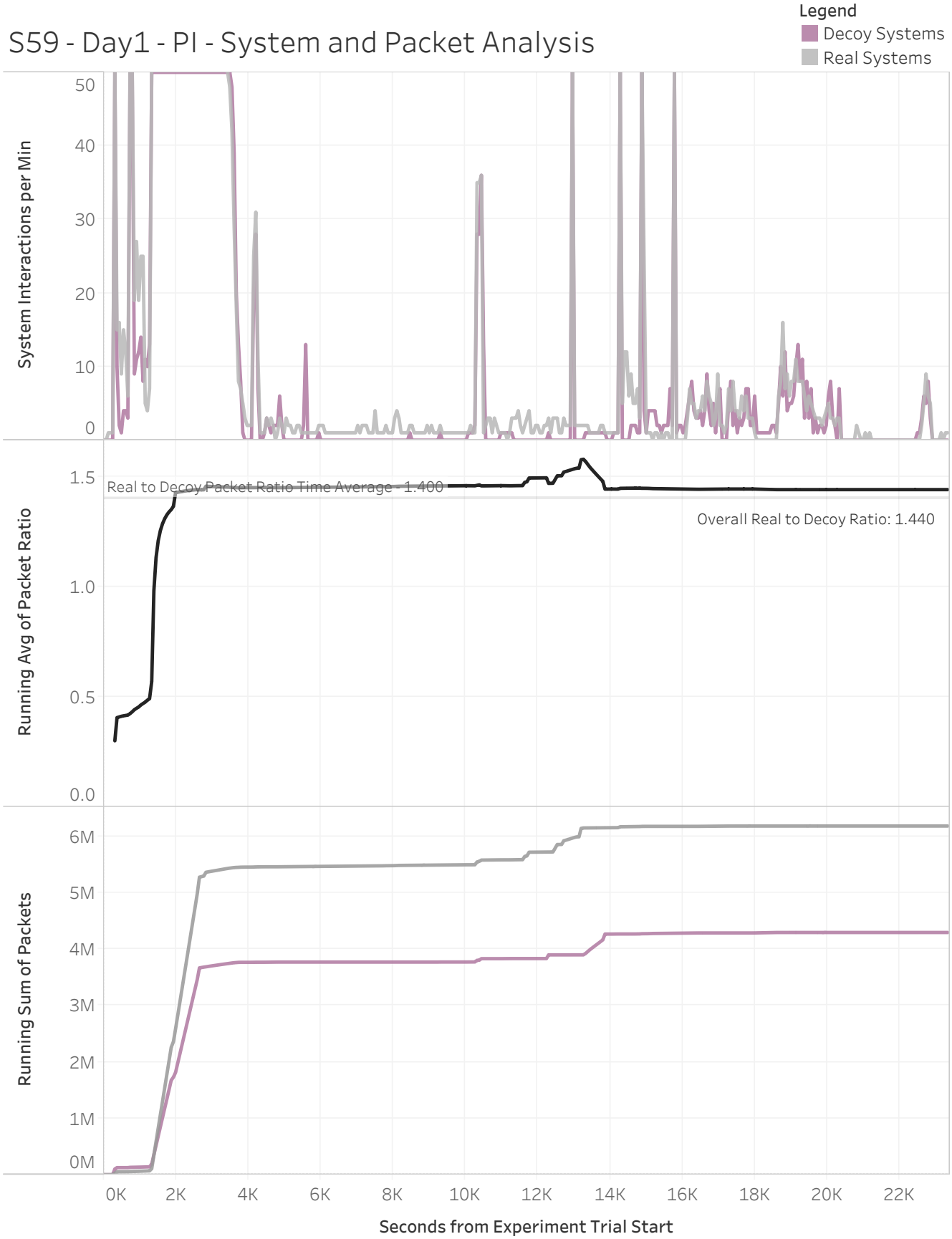


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

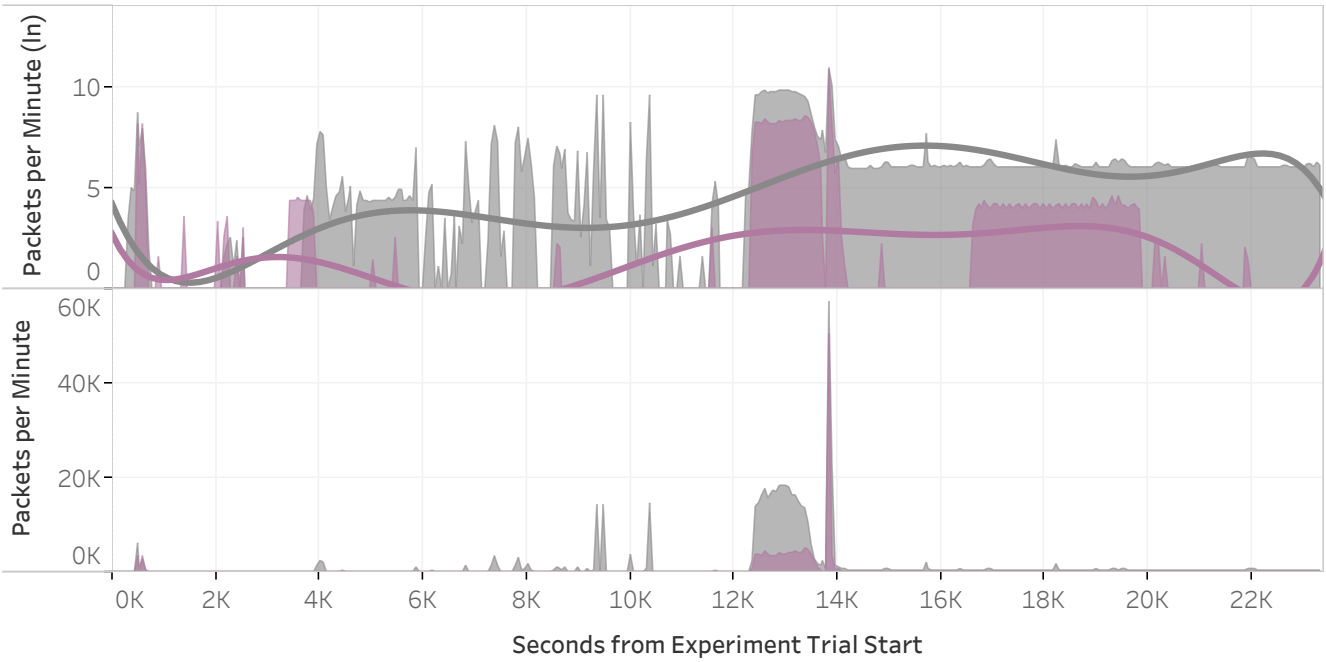



S59 - Day1 - PI - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
1.5
1.0
0.5
0.0
Real to Decoy Packet Ratio Time Average - 1.400
Overall Real to Decoy Ratio: 1.440
Running Sum of Packets
6M
5M
4M
3M
2M
1M
0M
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

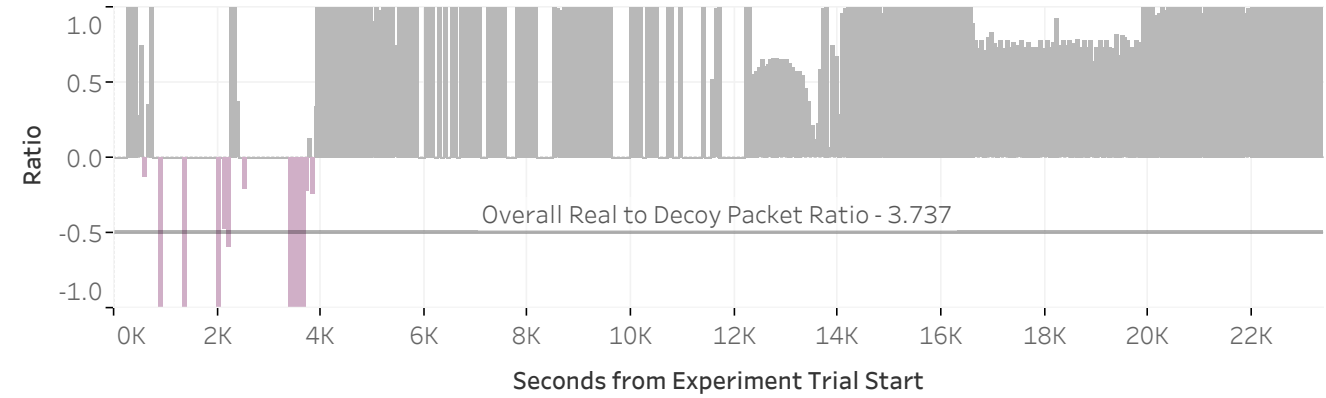
S60 - Day1 - PI

Legend
Real Systems
Decoy Systems

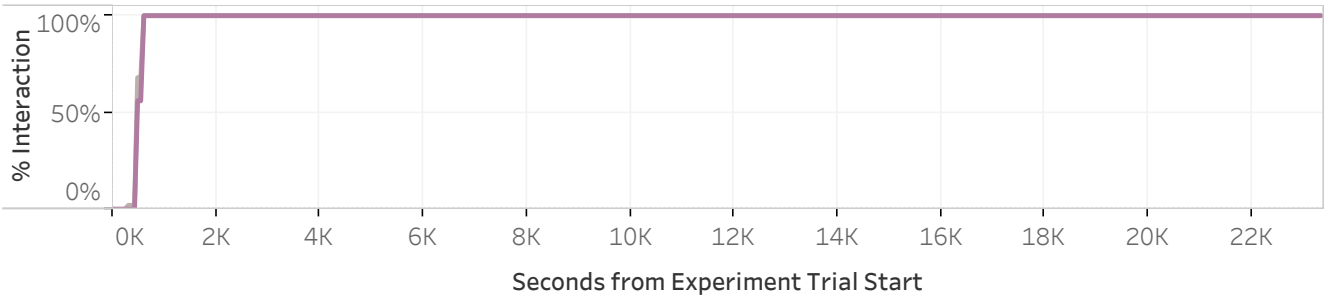
Real & Decoy Packets per Minute

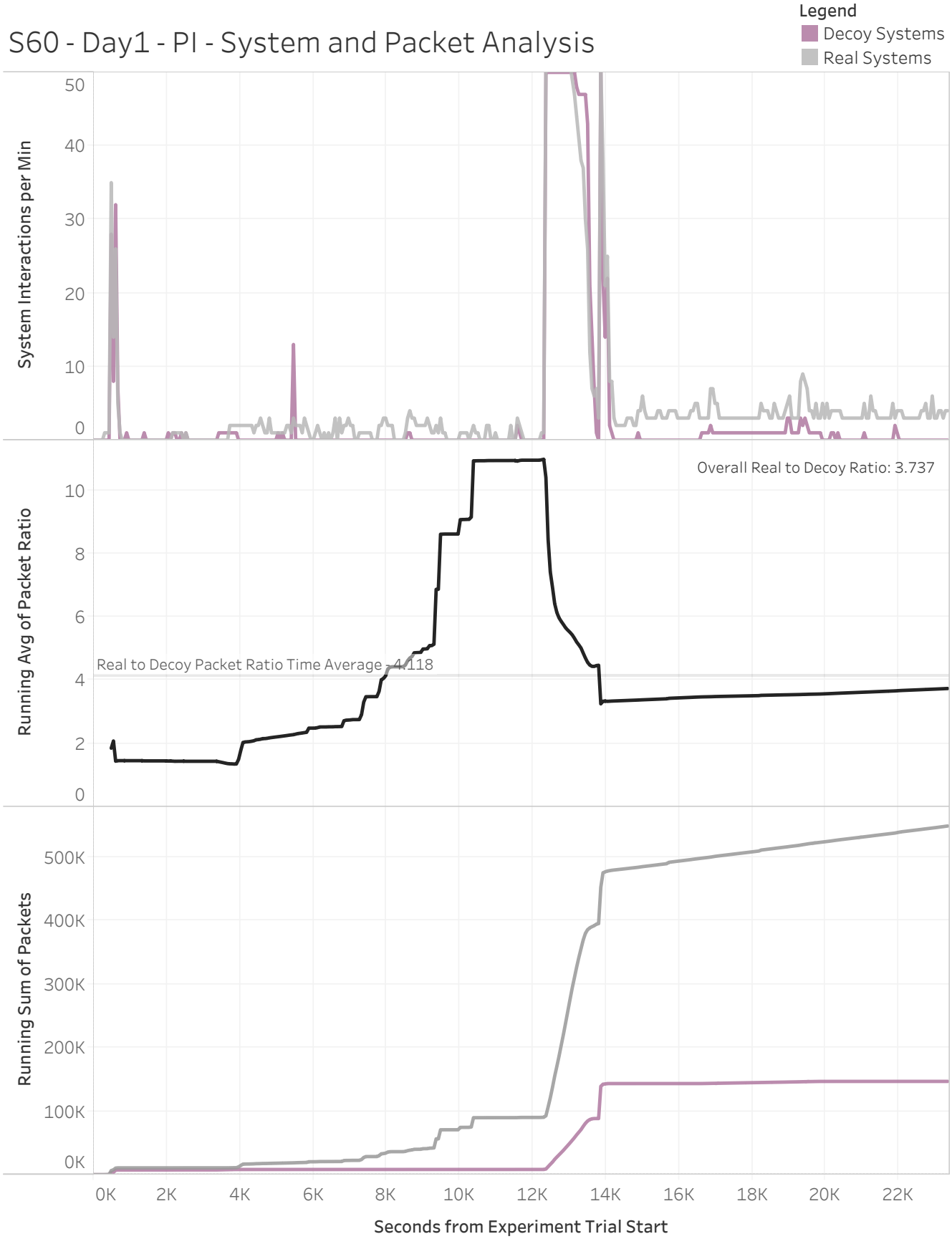


Real to Decoy Packet Ratio



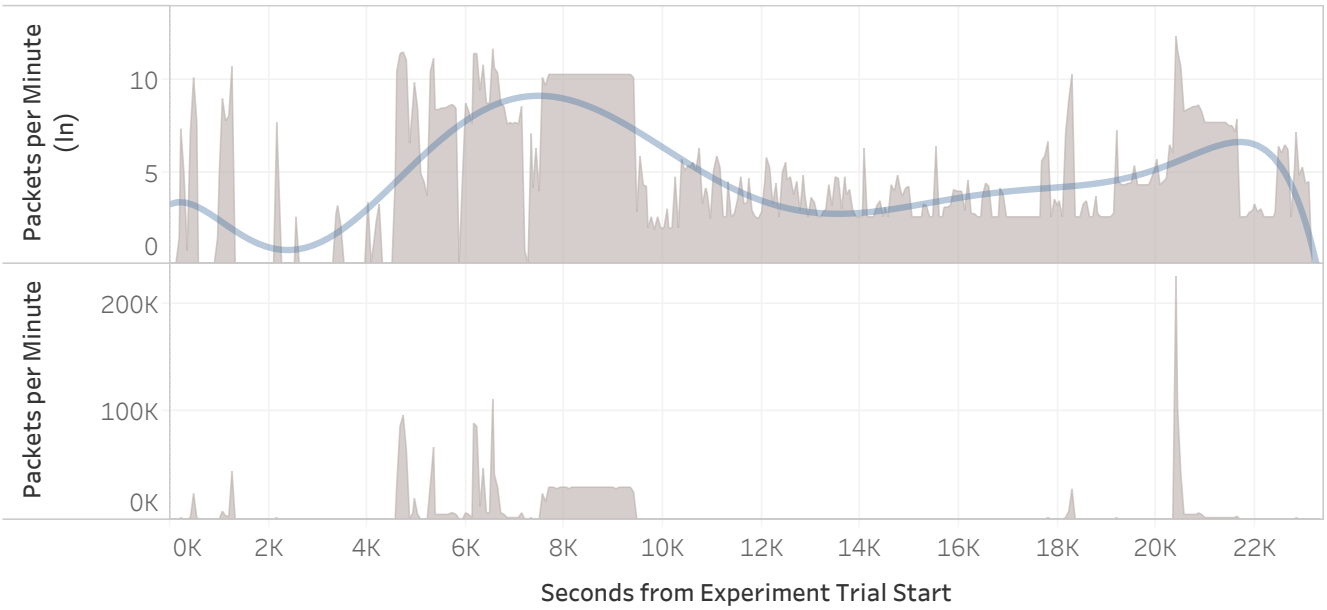
Real & Decoy System Interaction Timeline



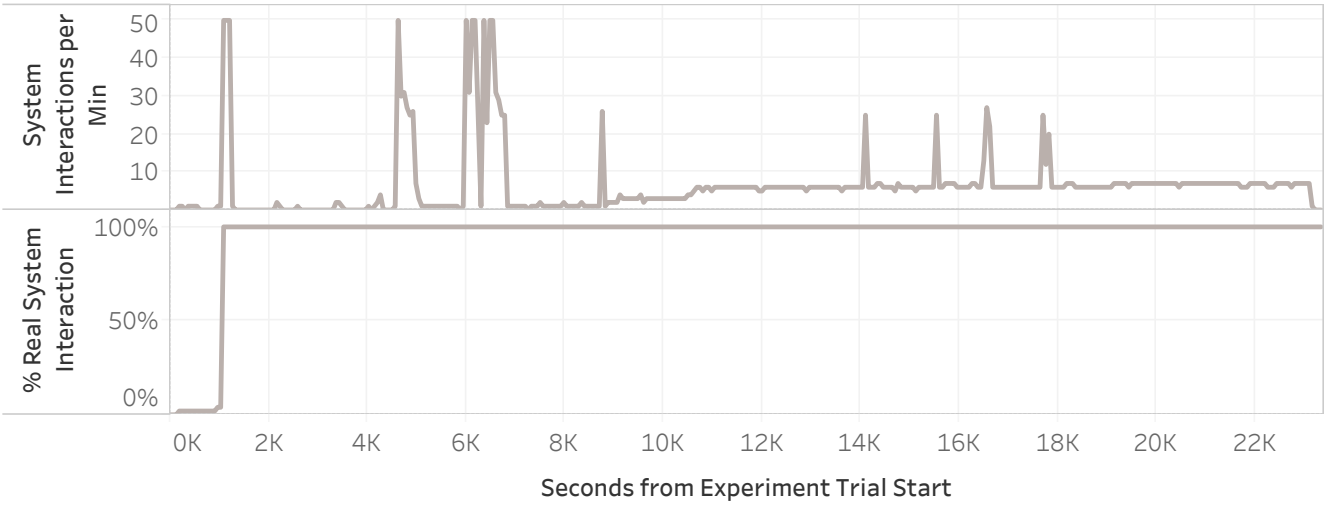

S60 - Day1 - PI - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
10
8
6
4
2
0
Overall Real to Decoy Ratio: 3.737
Real to Decoy Packet Ratio Time Average - 4.118
Running Sum of Packets
500K
400K
300K
200K
100K
0K
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

S61 - Day 1 - AI

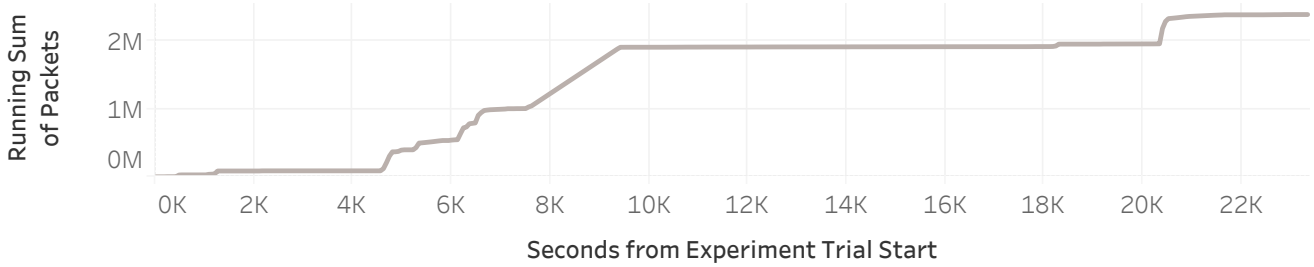
Real Packets per Minute



Real System Interaction Timeline

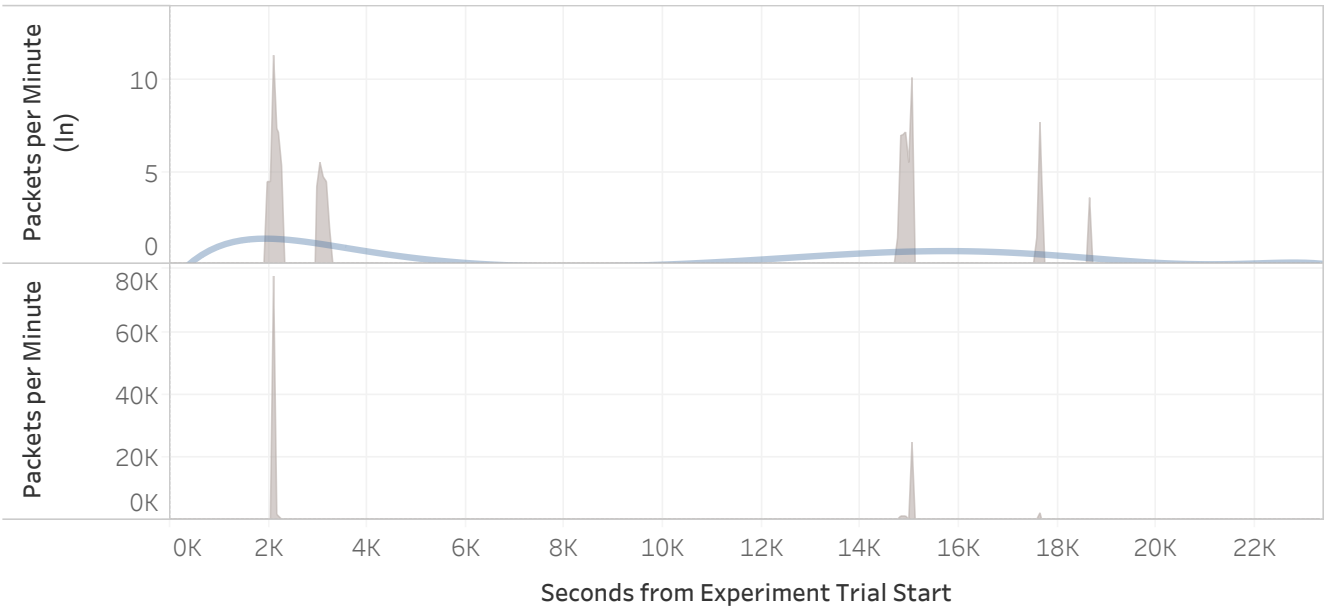


Running Sum of Packets

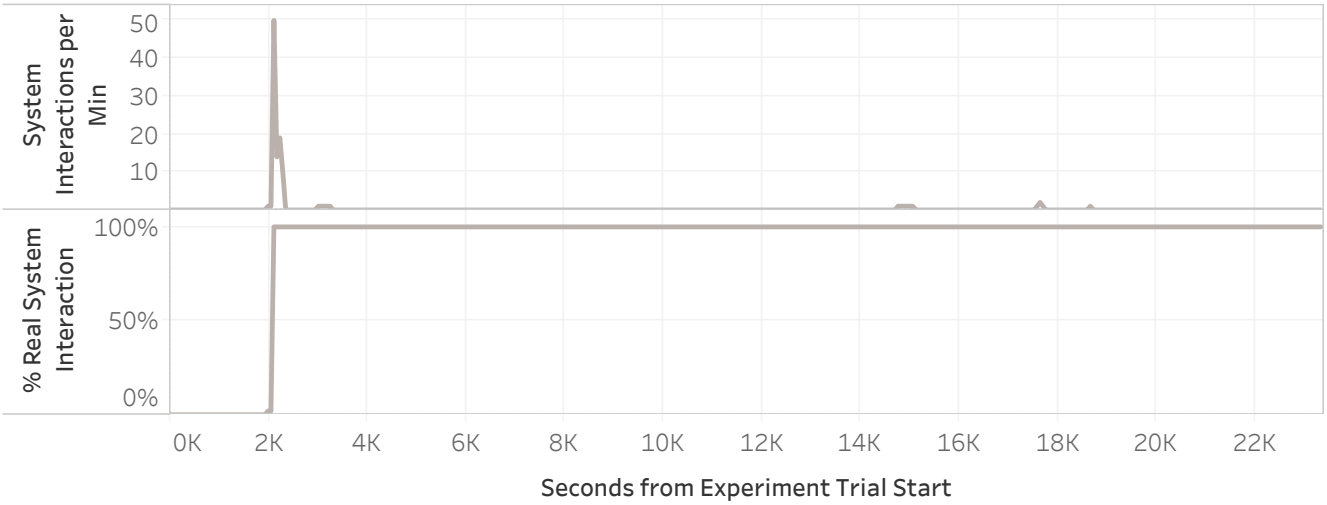


S62 - Day 1 - AI

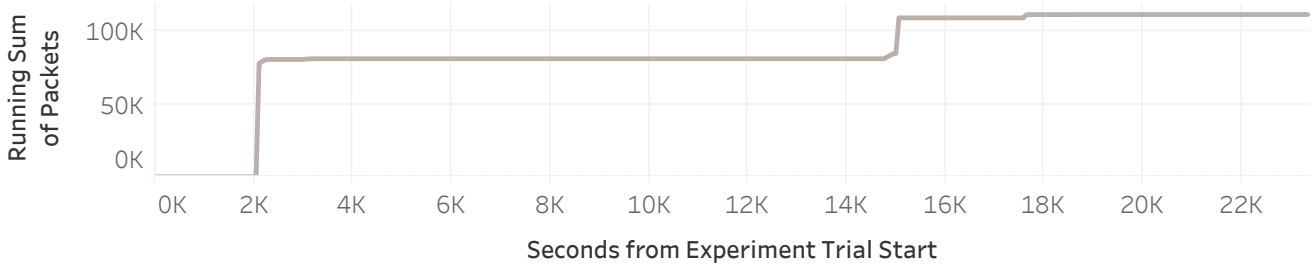
Real Packets per Minute



Real System Interaction Timeline

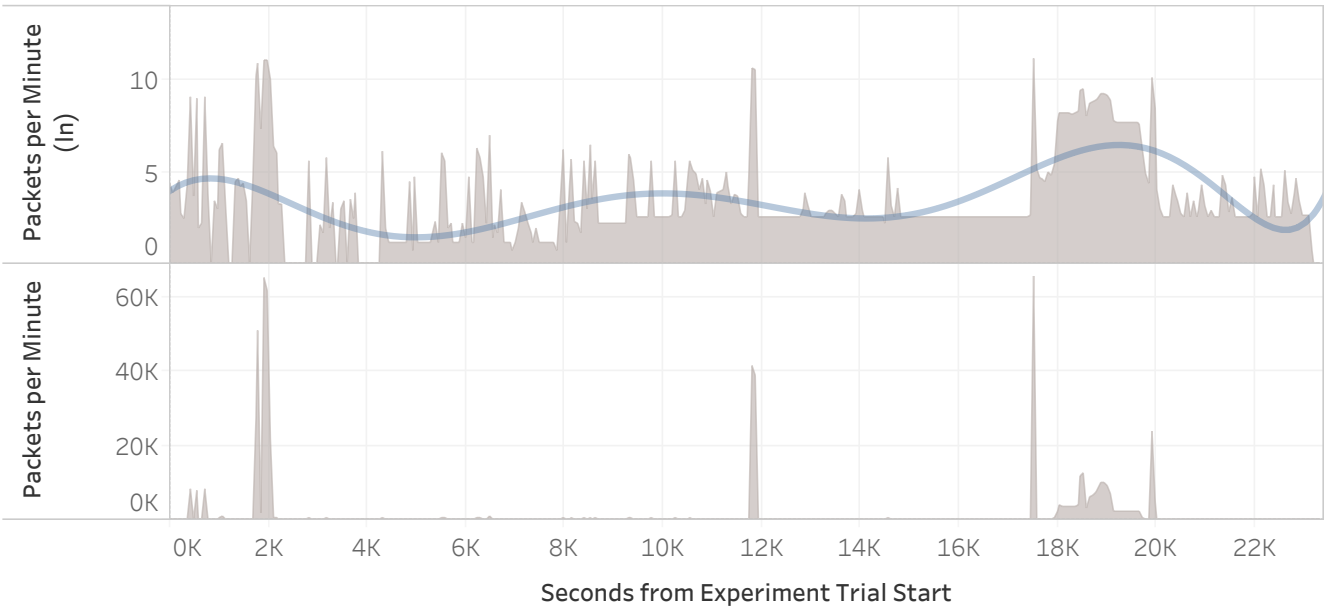


Running Sum of Packets

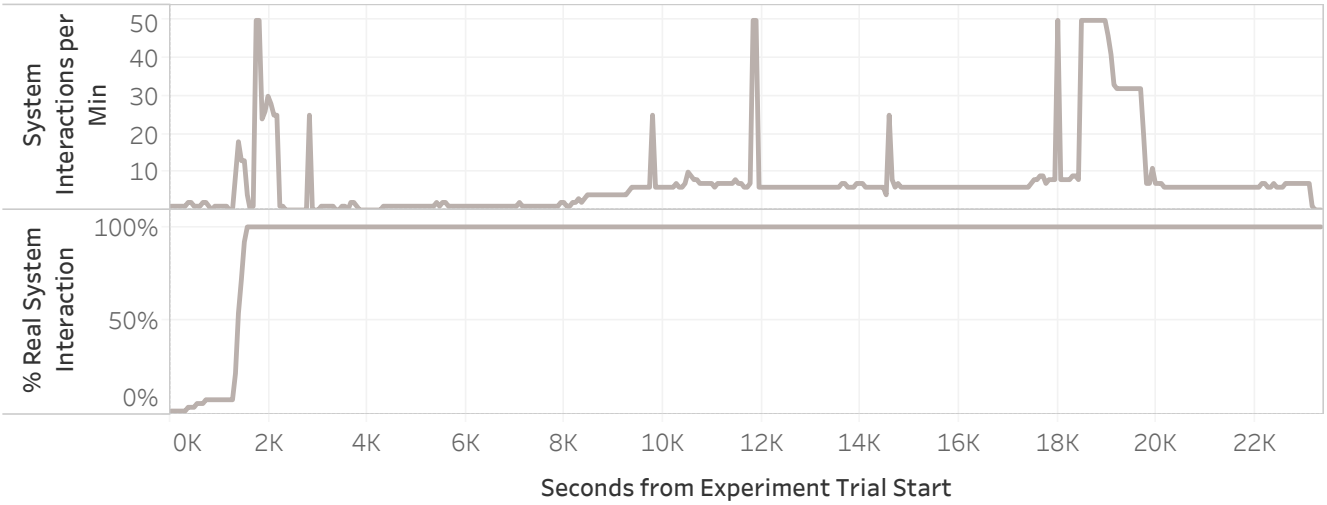


S63 - Day 1 - AI

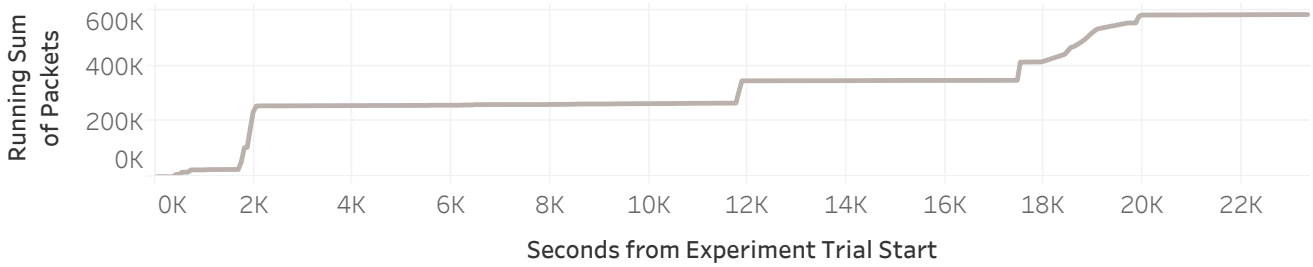
Real Packets per Minute



Real System Interaction Timeline

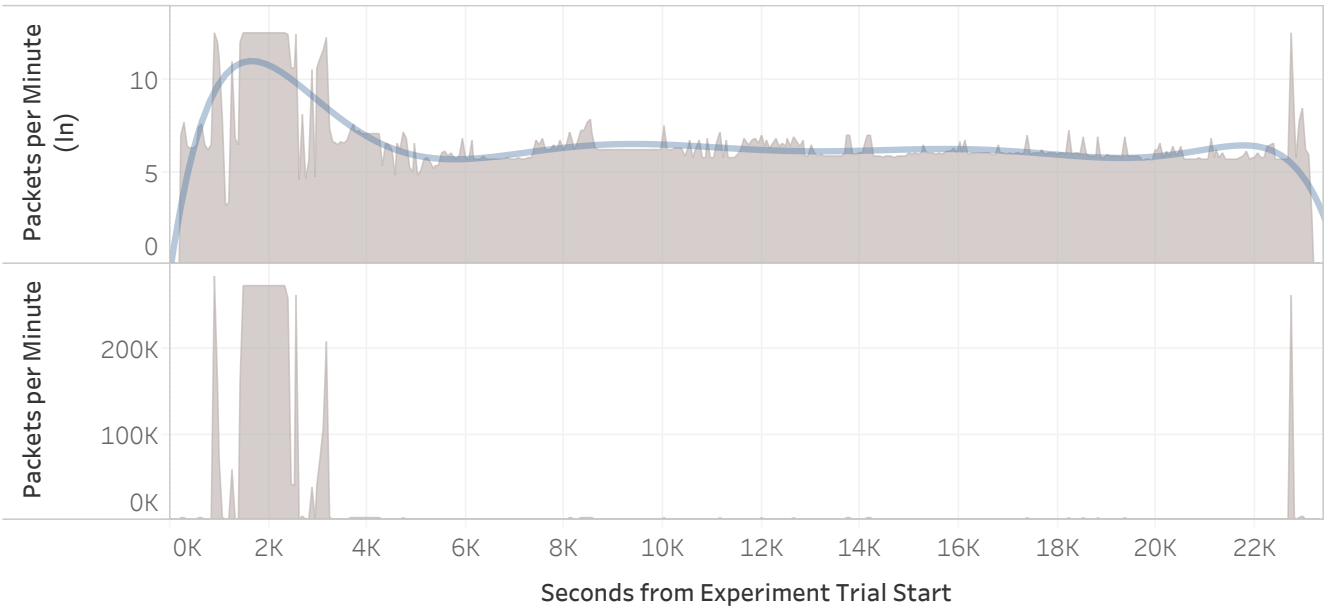


Running Sum of Packets

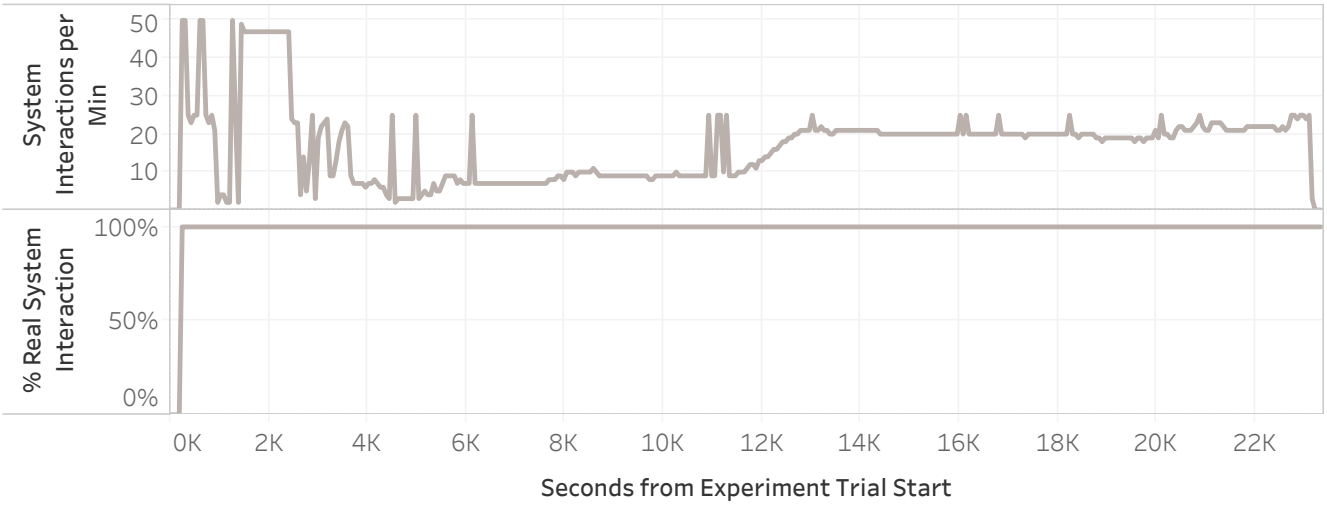


S65 - Day 1 - AI

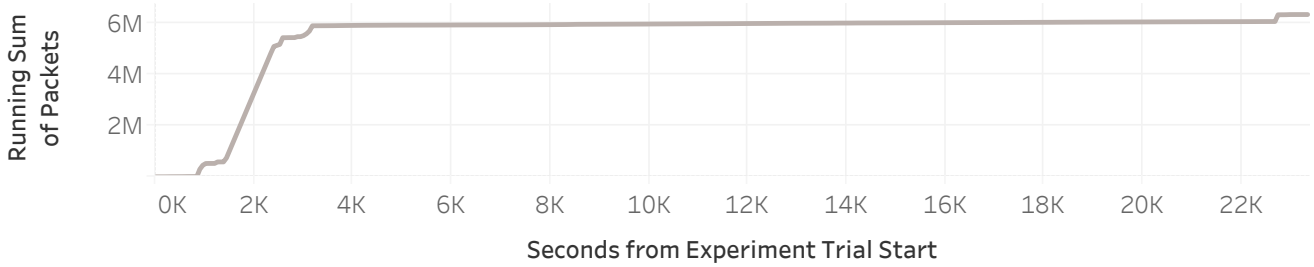
Real Packets per Minute



Real System Interaction Timeline

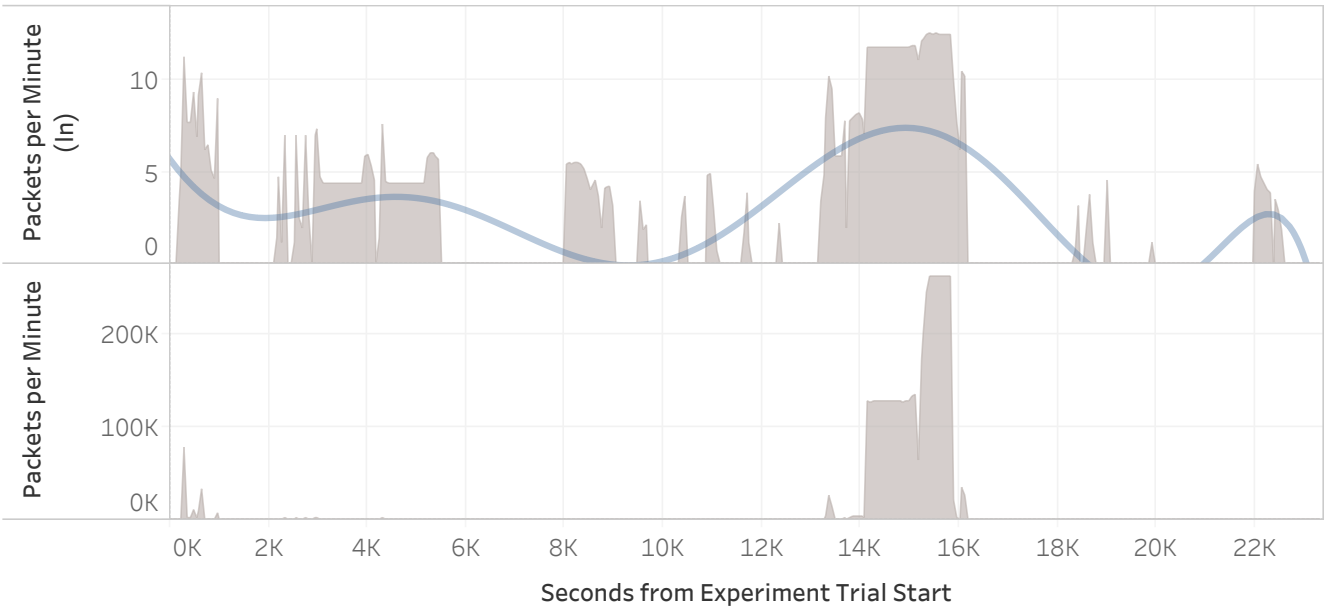


Running Sum of Packets

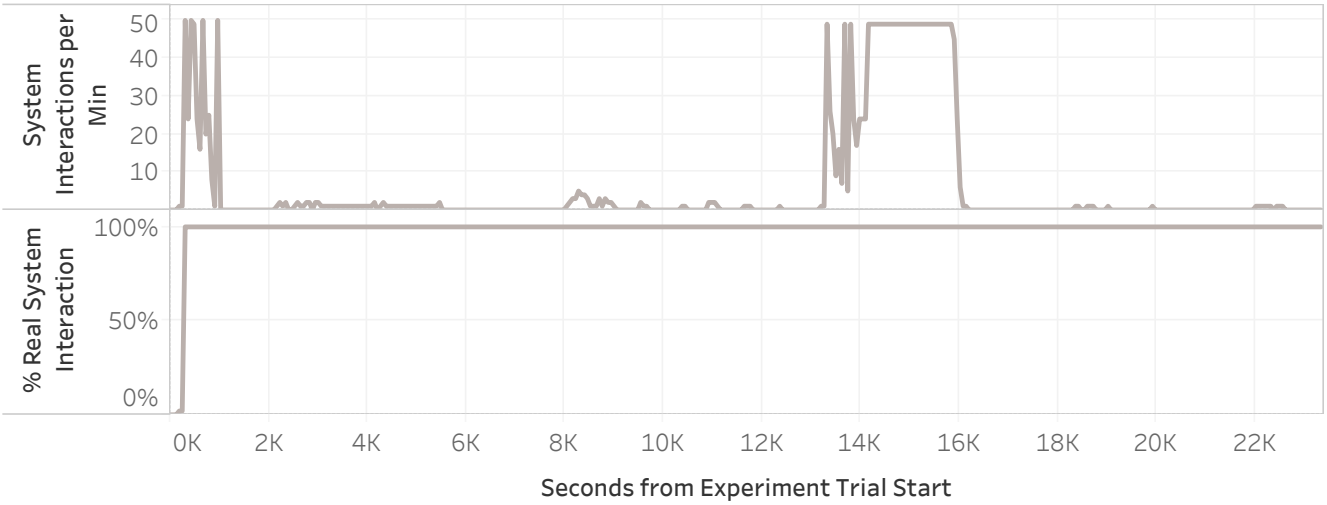


S66 - Day 1 - AI

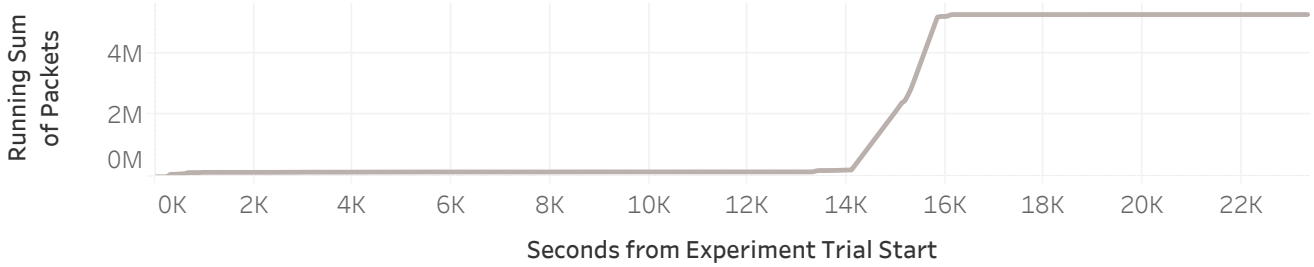
Real Packets per Minute



Real System Interaction Timeline

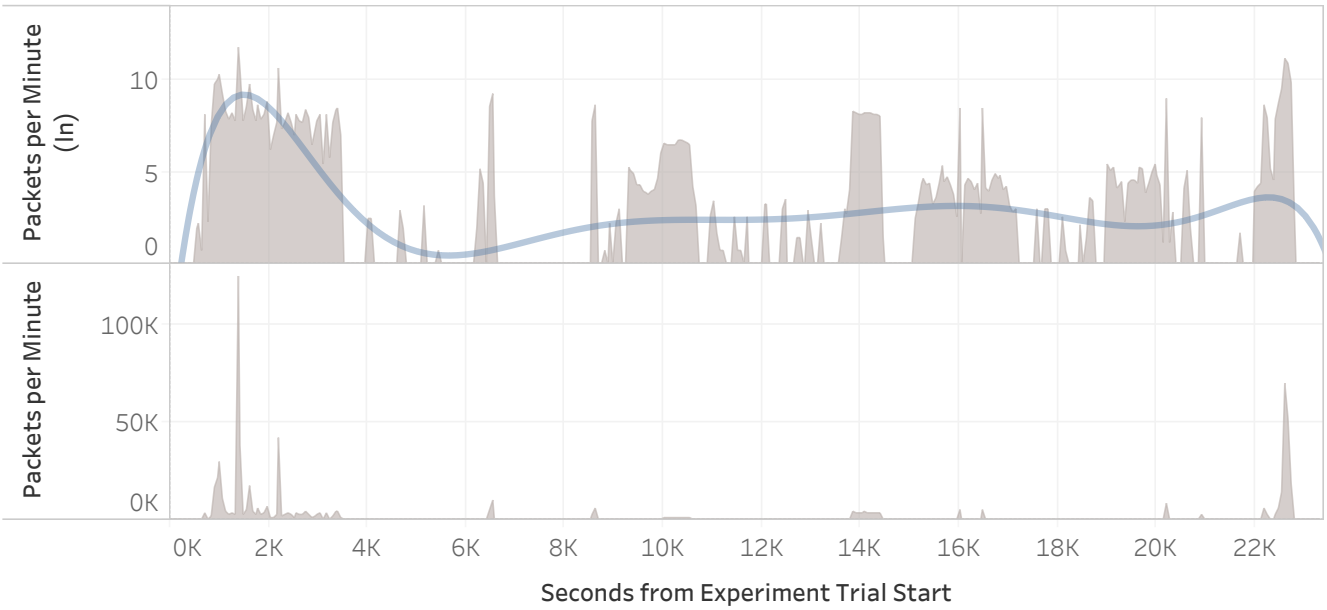


Running Sum of Packets

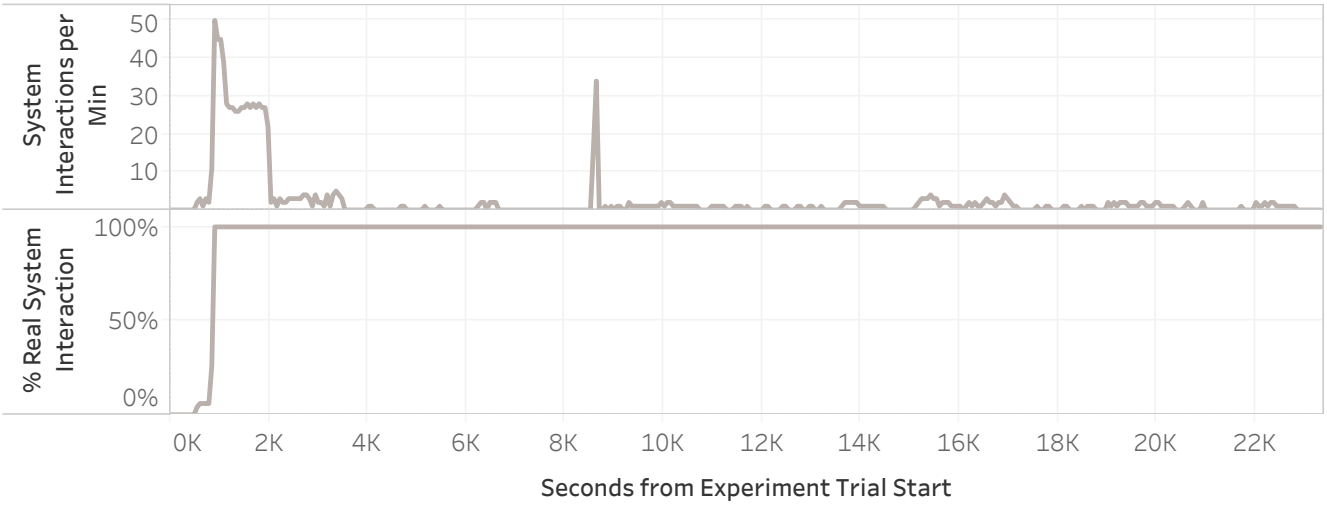


S67 - Day 1 - AI

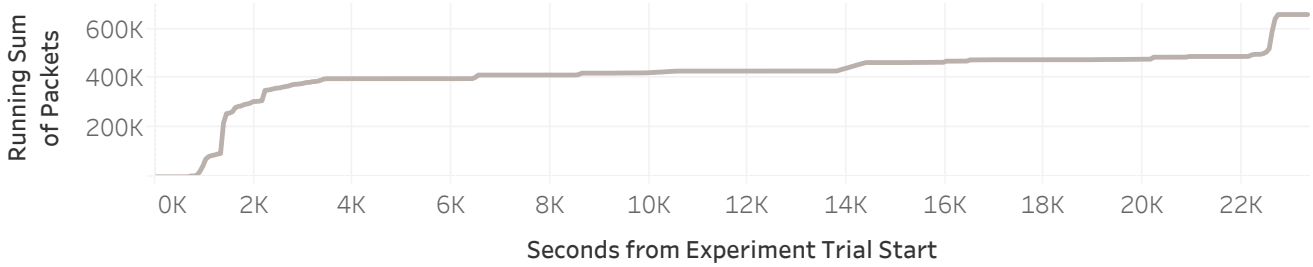
Real Packets per Minute



Real System Interaction Timeline



Running Sum of Packets



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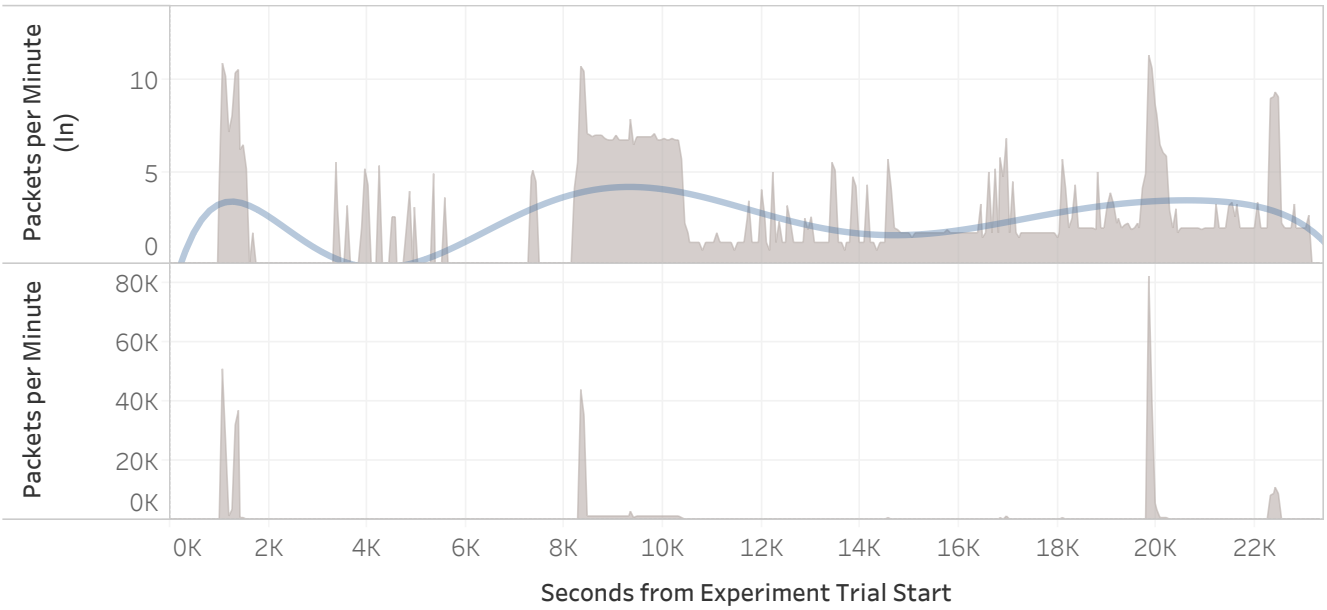
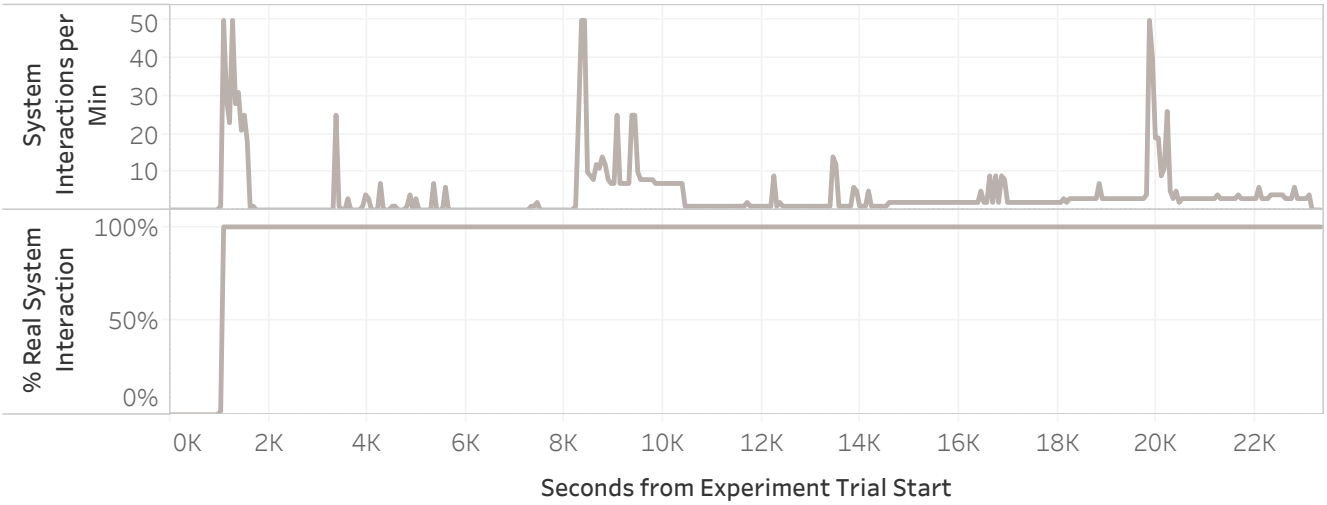
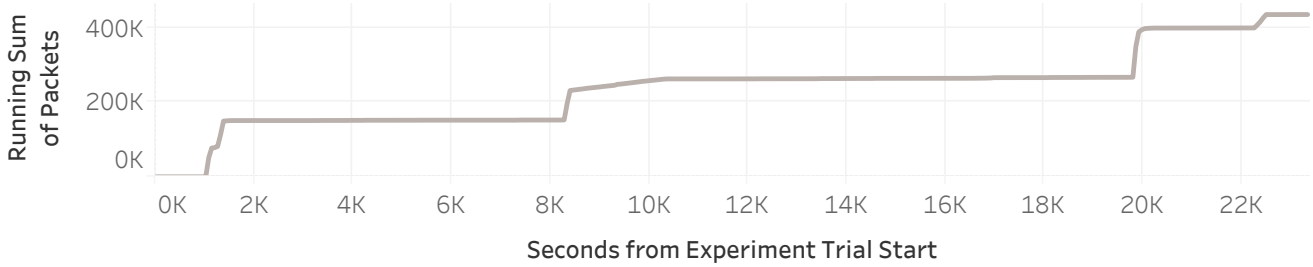
Real Packets per Minute



Real System Interaction Timeline

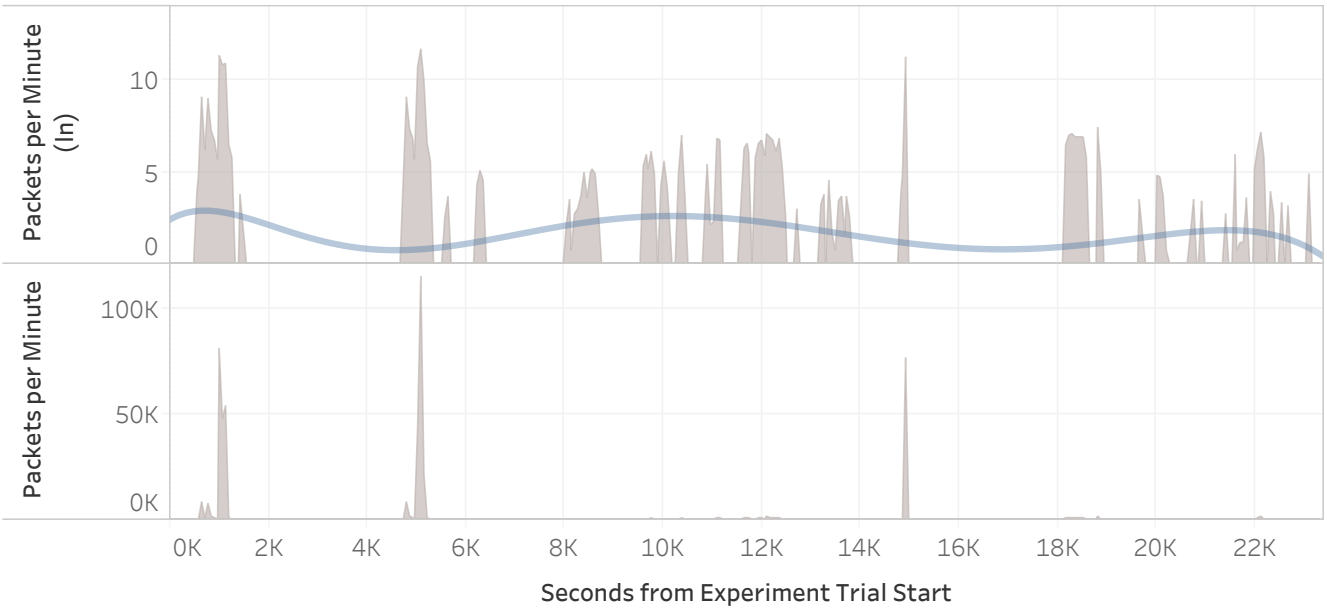


Running Sum of Packets

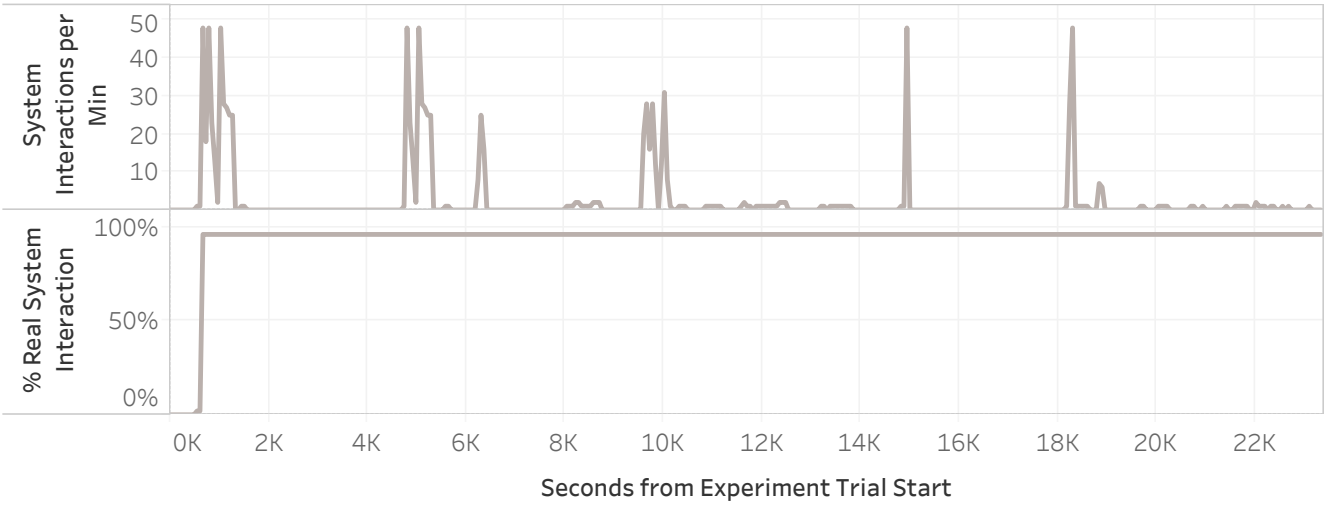


S70 - Day 1 - AI

Real Packets per Minute



Real System Interaction Timeline



Running Sum of Packets

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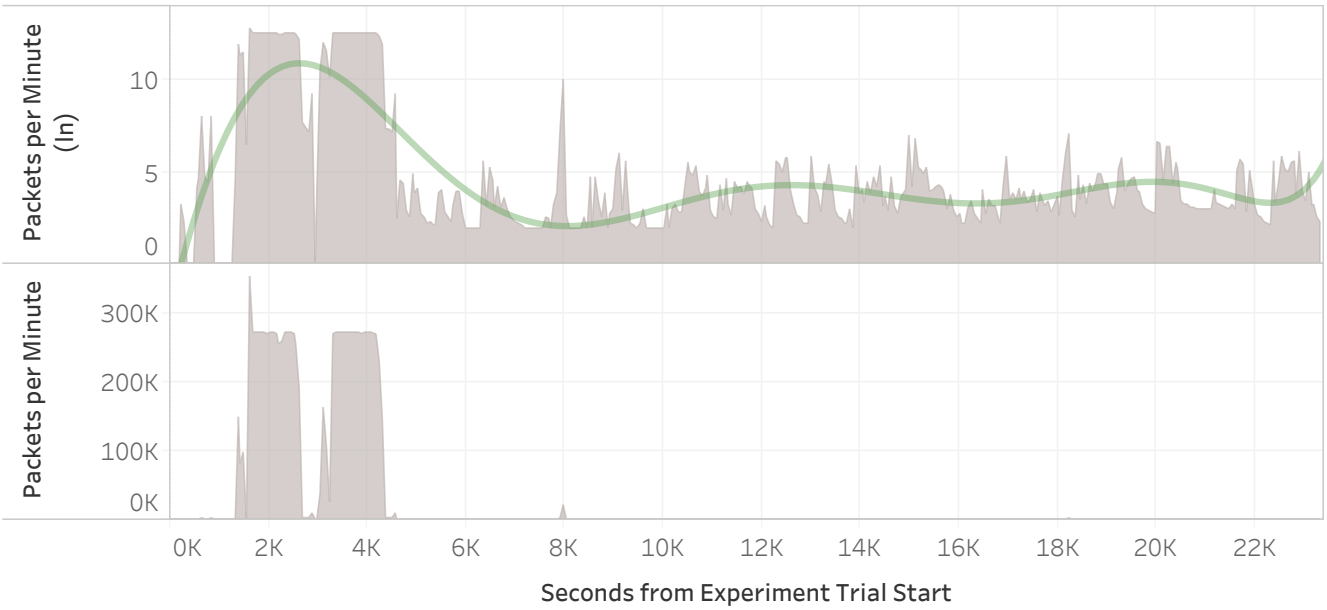
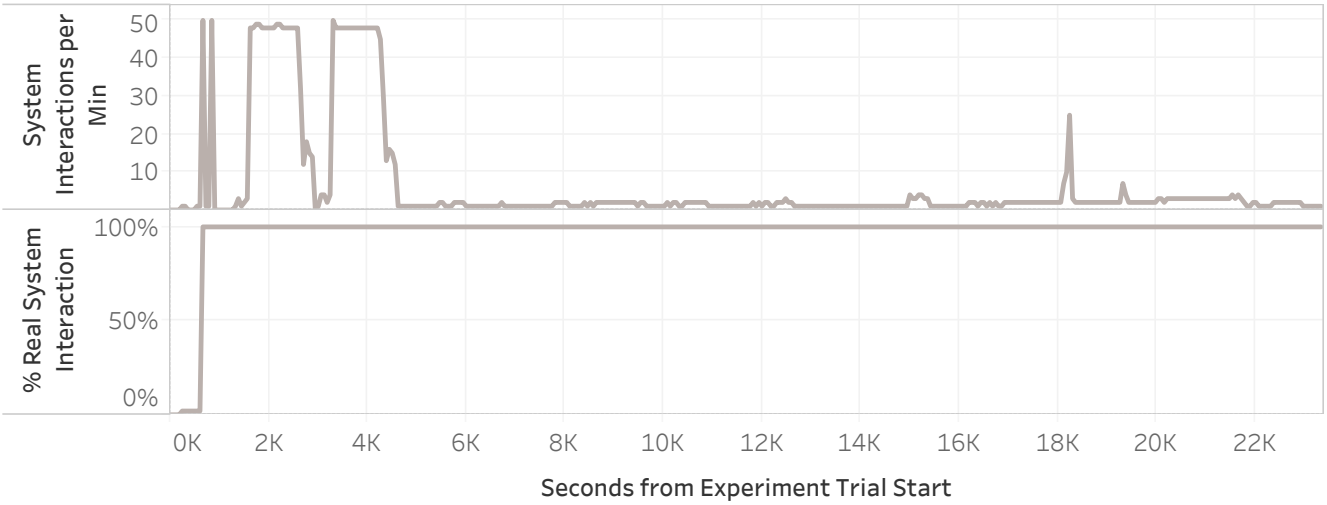
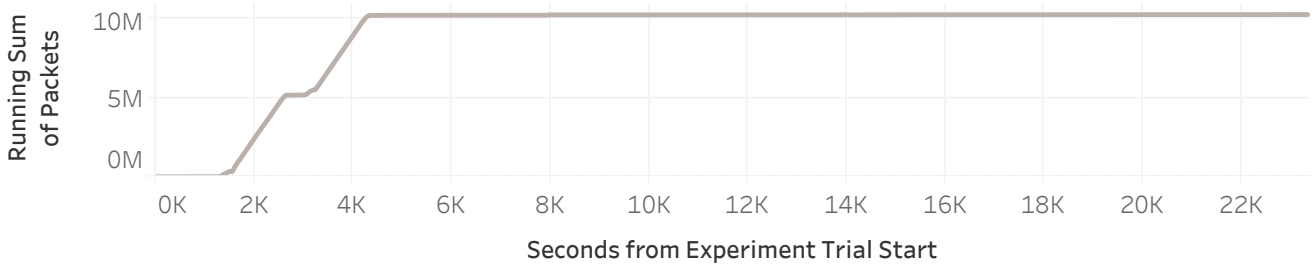
Real Packets per Minute



Real System Interaction Timeline



Running Sum of Packets



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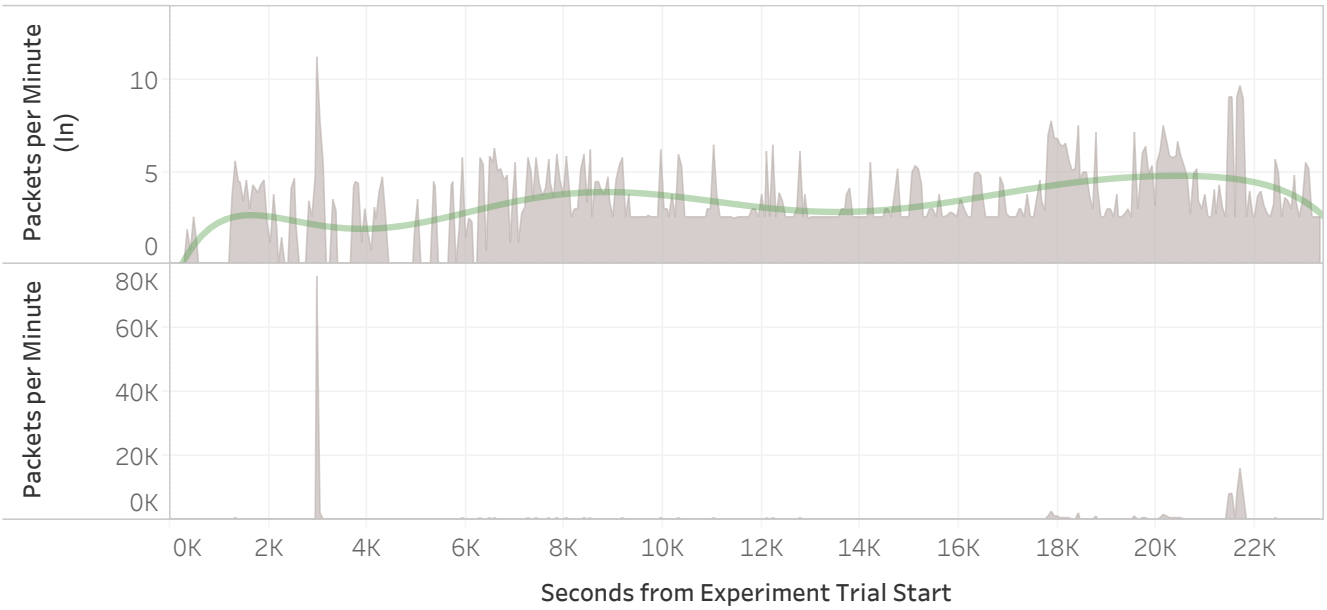
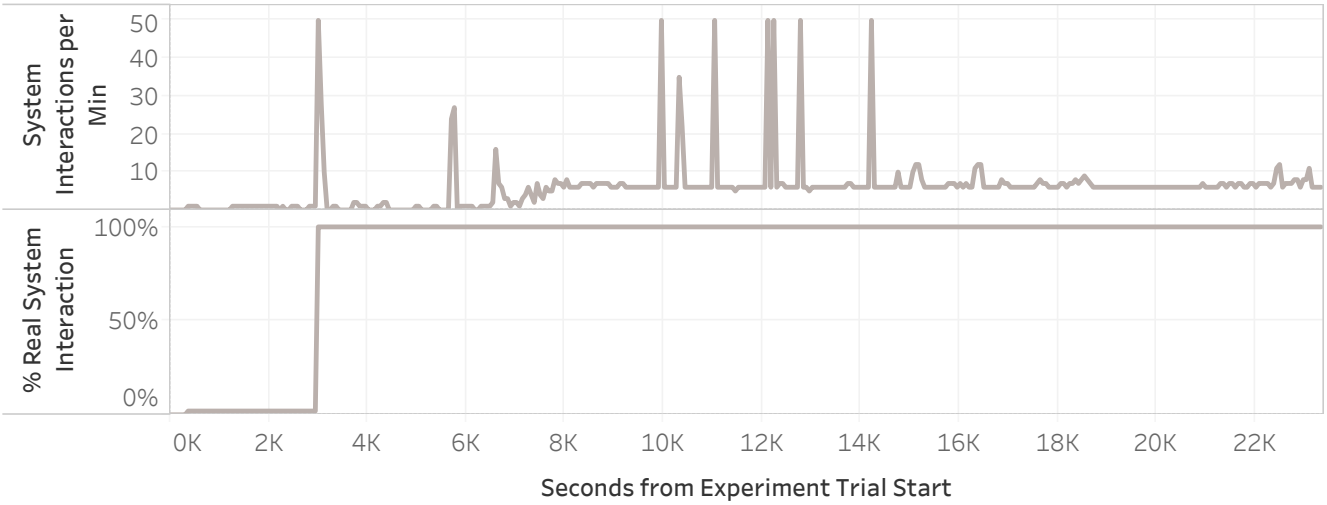
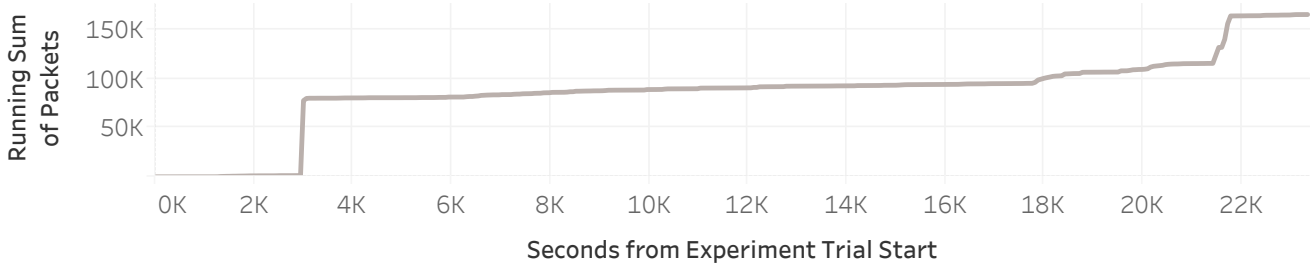
Real Packets per Minute



Real System Interaction Timeline

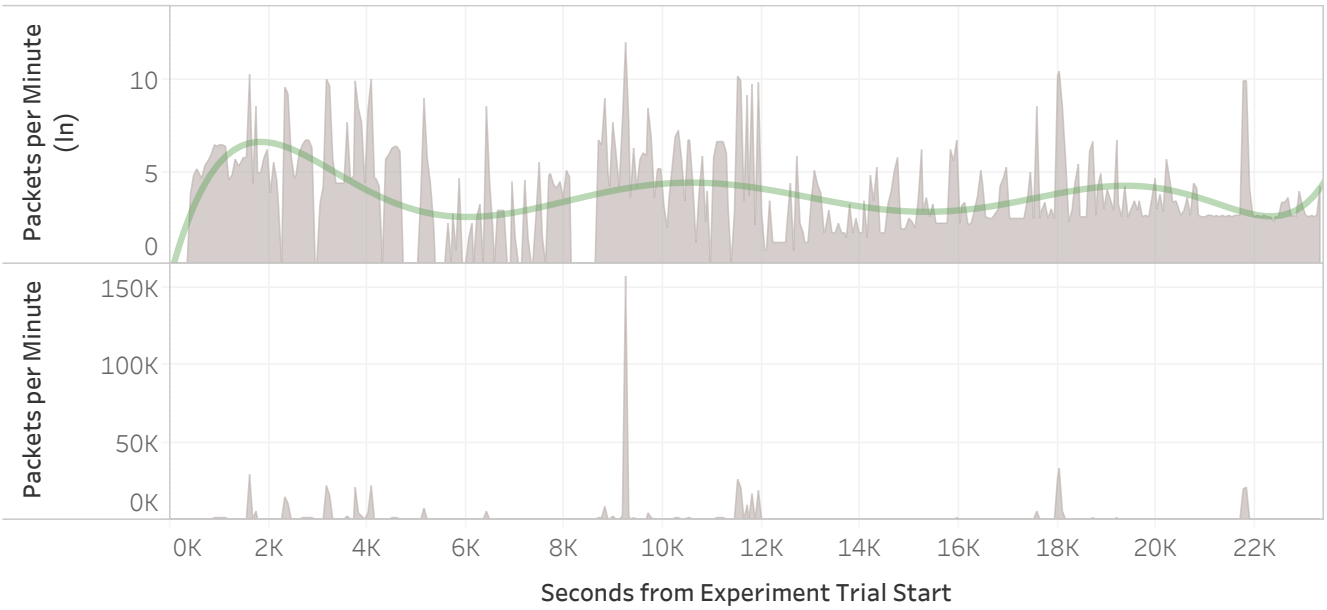


Running Sum of Packets

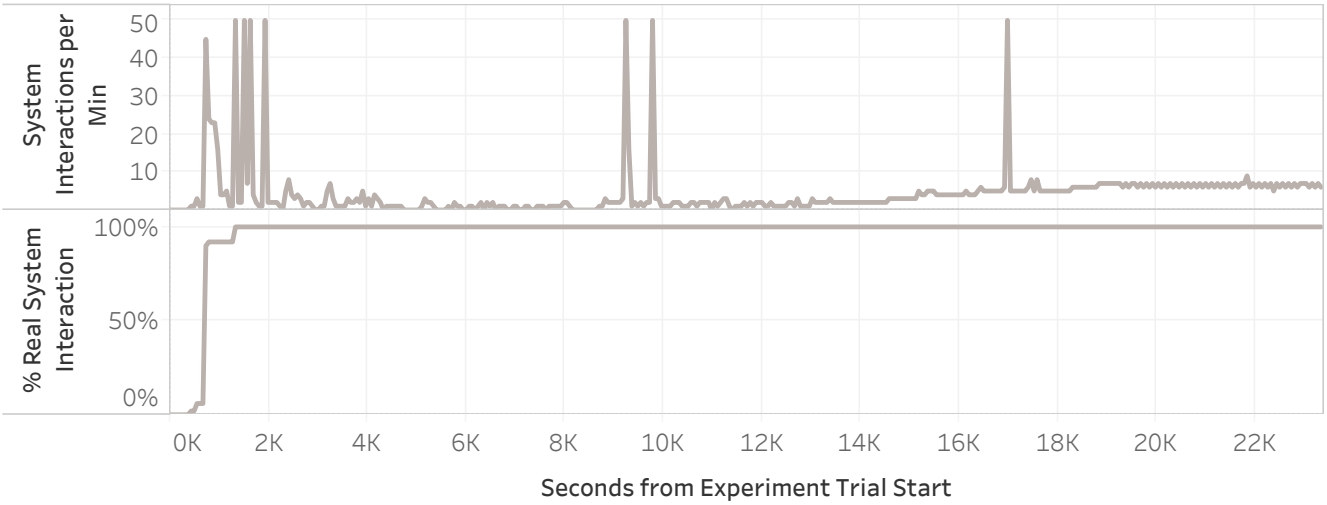


S73 - Day 1 - AU

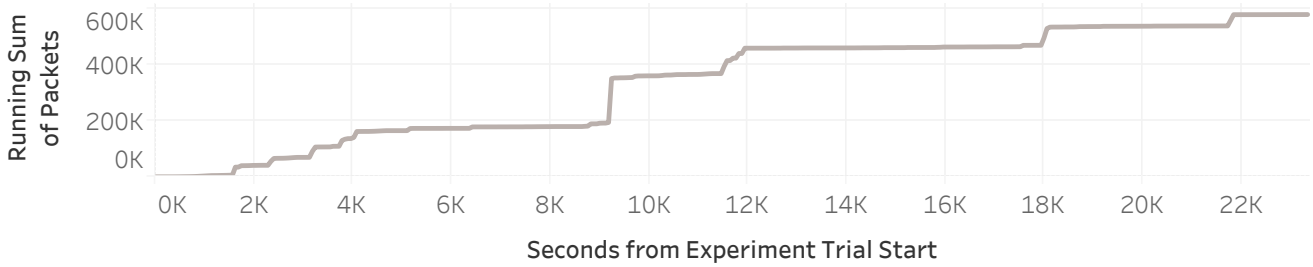
Real Packets per Minute



Real System Interaction Timeline

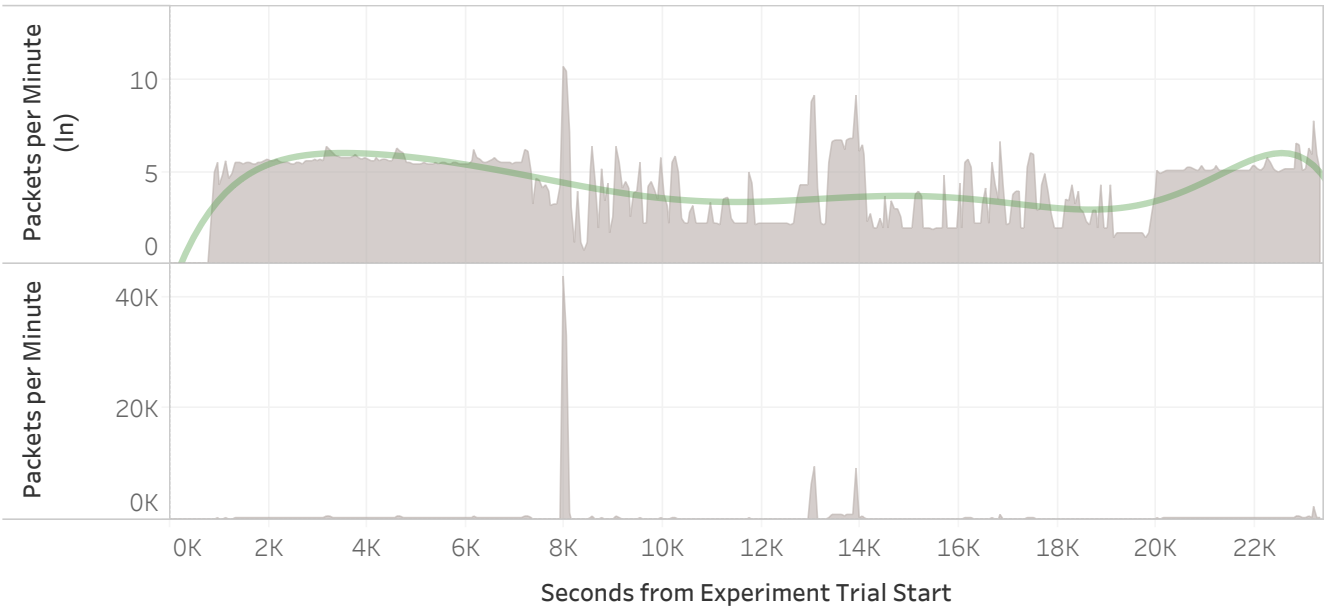


Running Sum of Packets

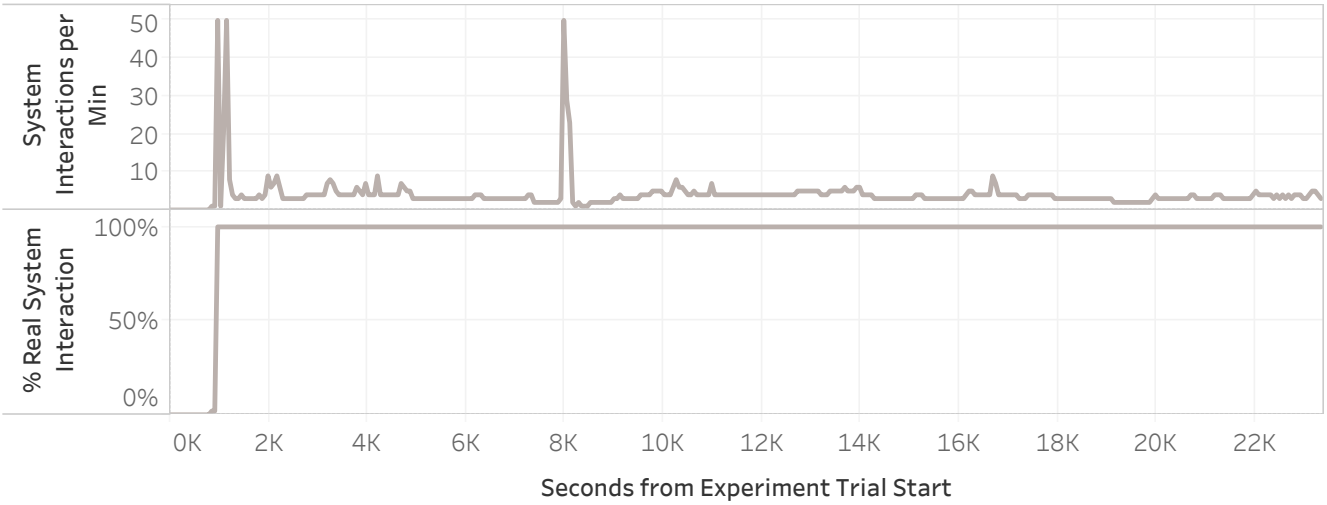


S74 - Day 1 - AU

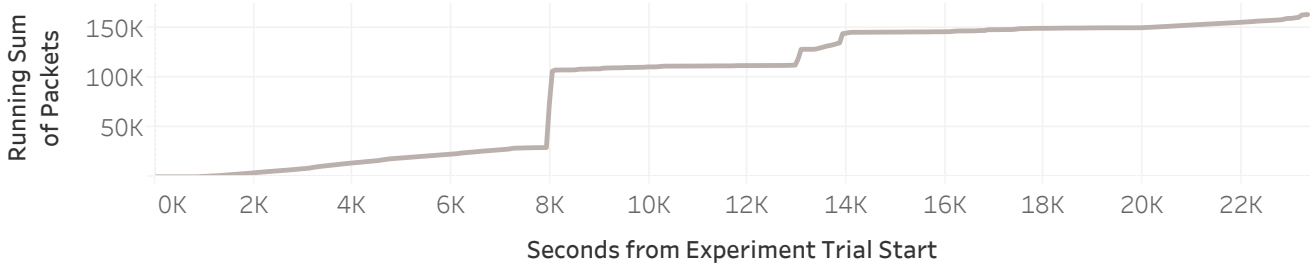
Real Packets per Minute



Real System Interaction Timeline

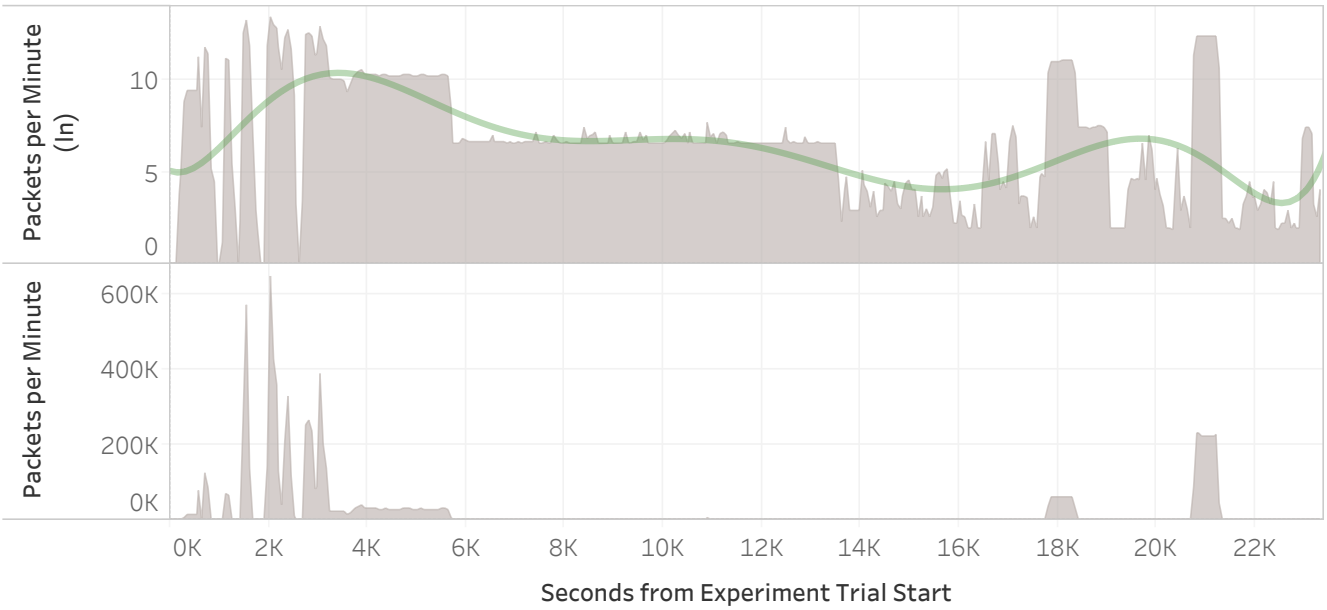


Running Sum of Packets

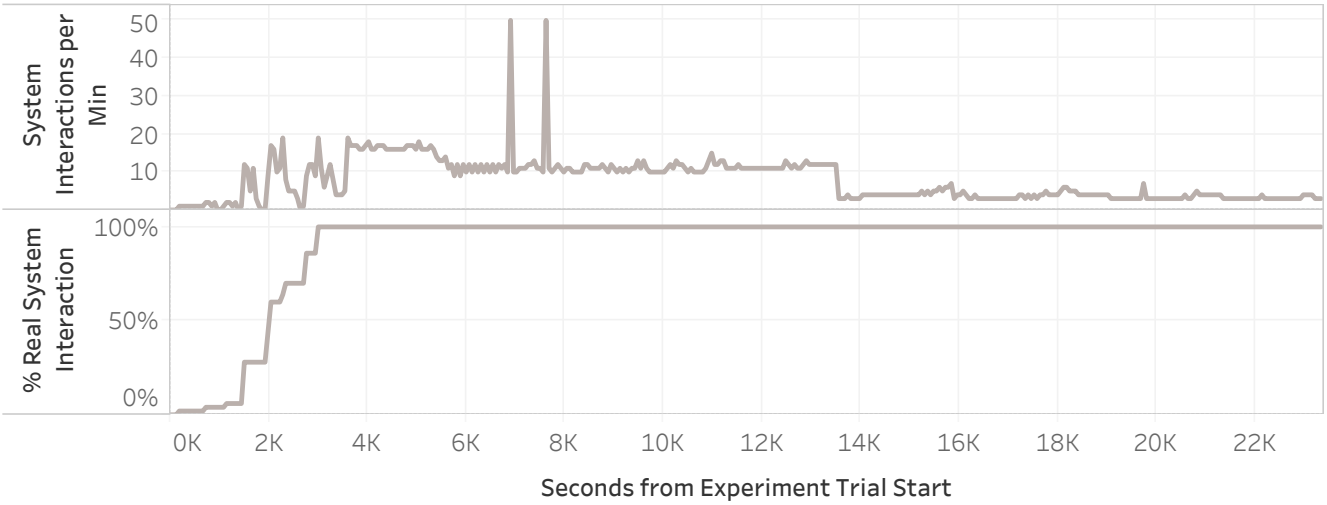


S75 - Day 1 - AU

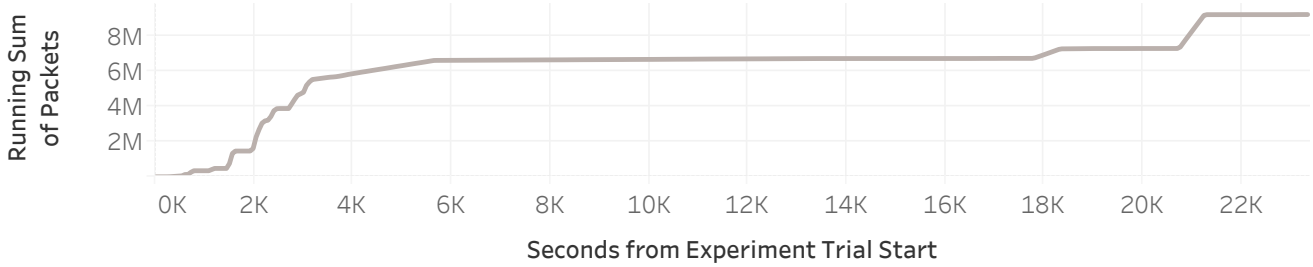
Real Packets per Minute



Real System Interaction Timeline

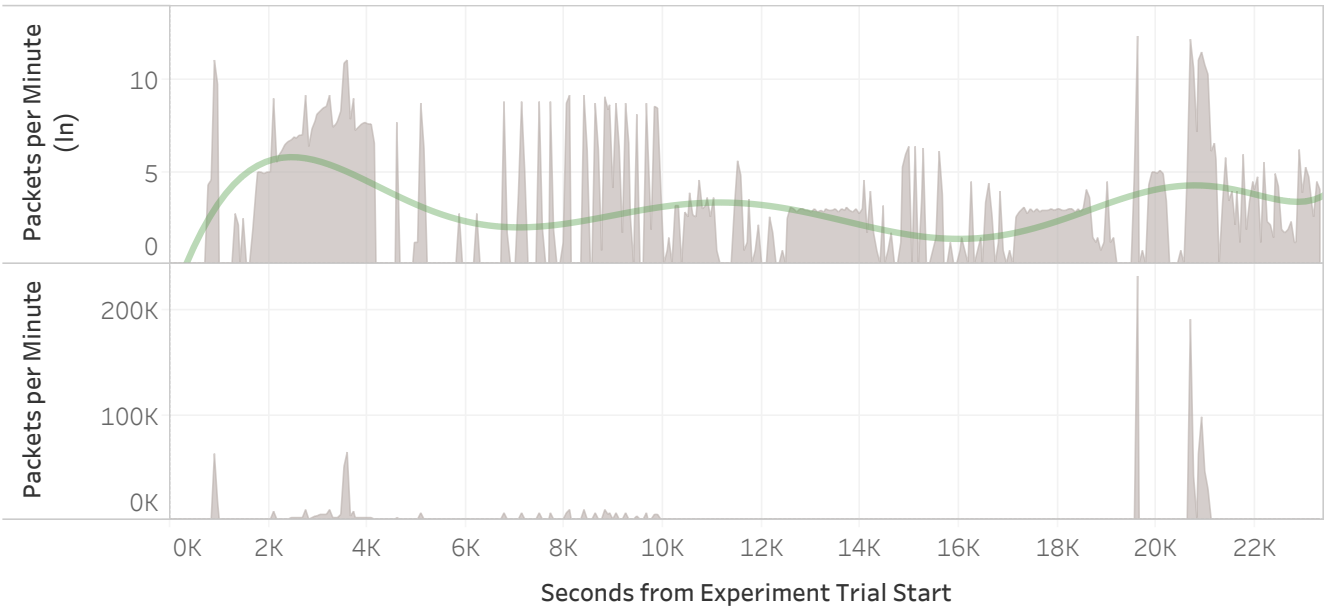


Running Sum of Packets

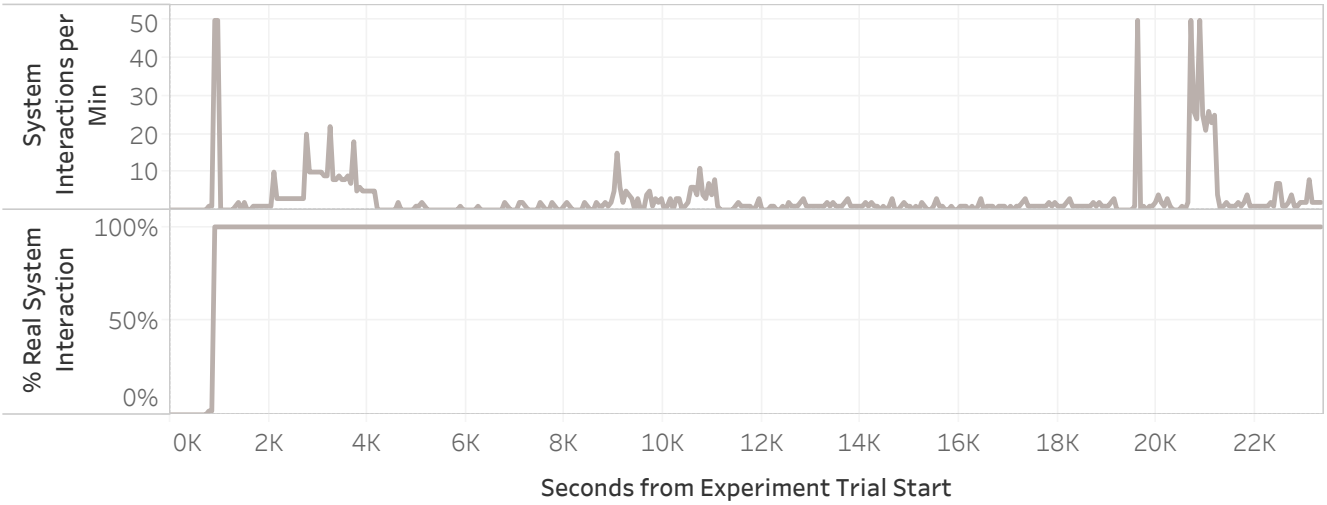


S76 - Day 1 - AU

Real Packets per Minute



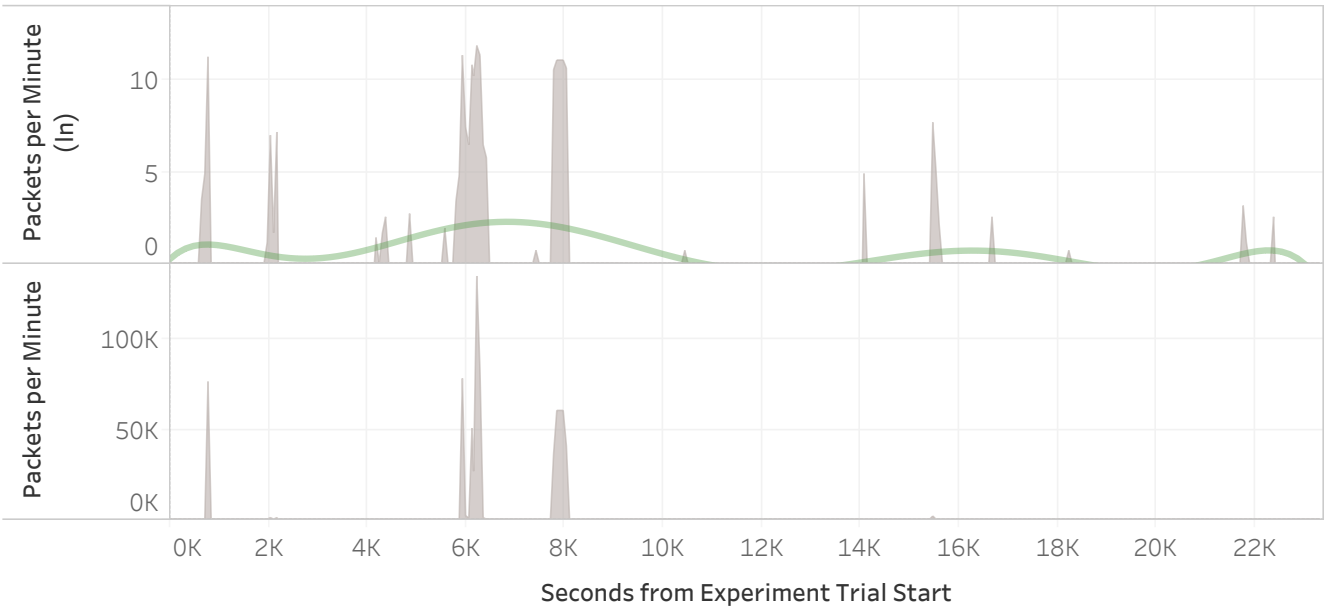
Real System Interaction Timeline



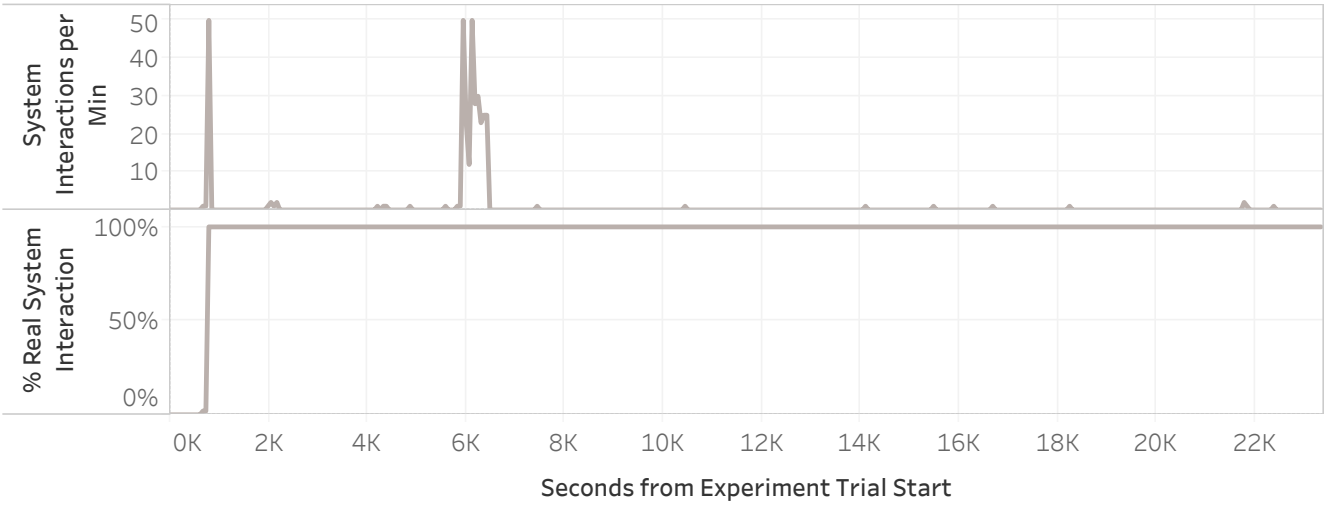
Running Sum of Packets

S77 - Day 1 - AU

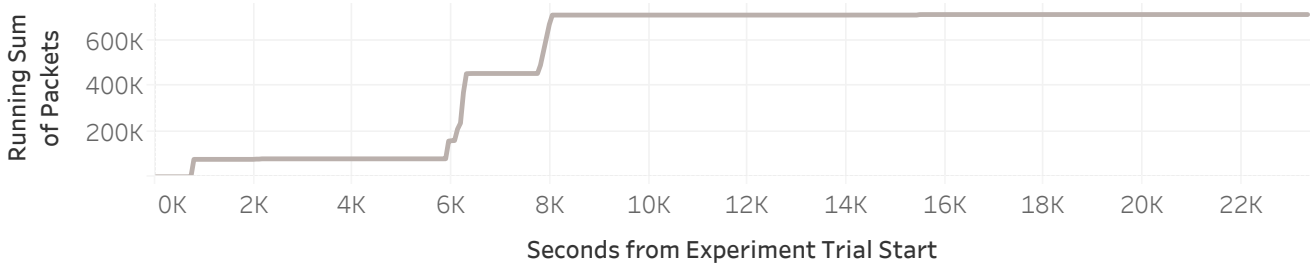
Real Packets per Minute



Real System Interaction Timeline



Running Sum of Packets



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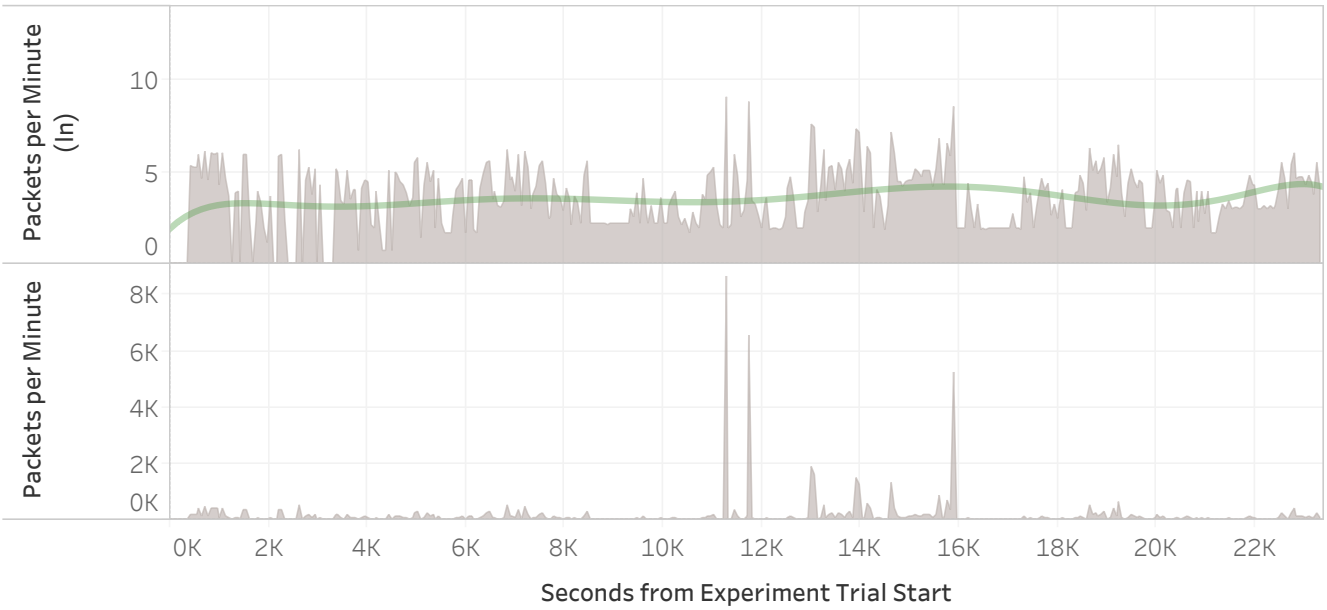
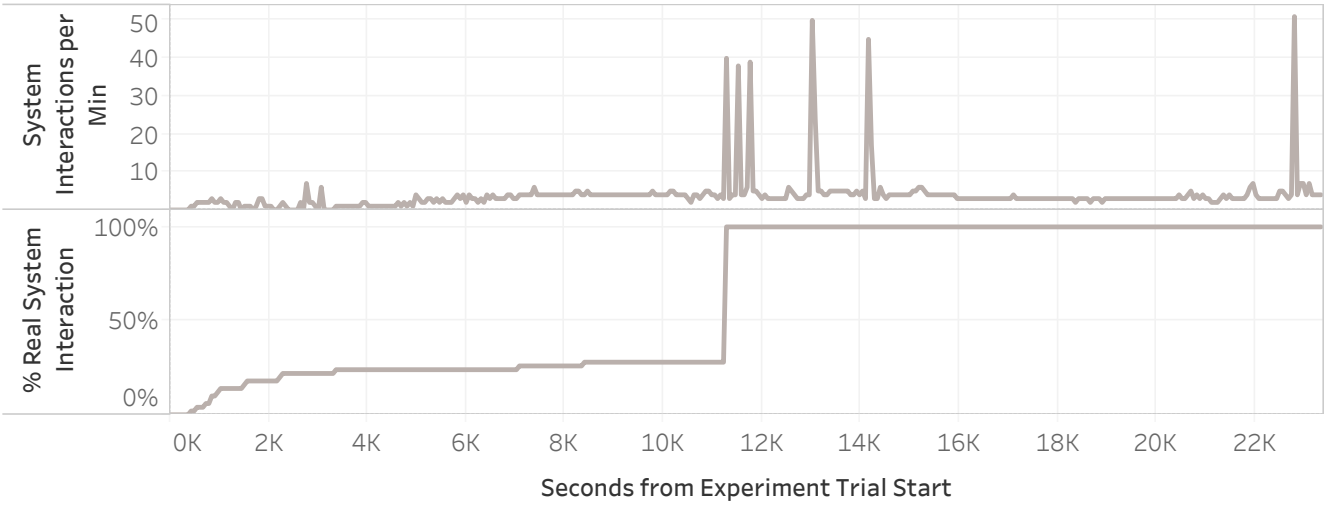
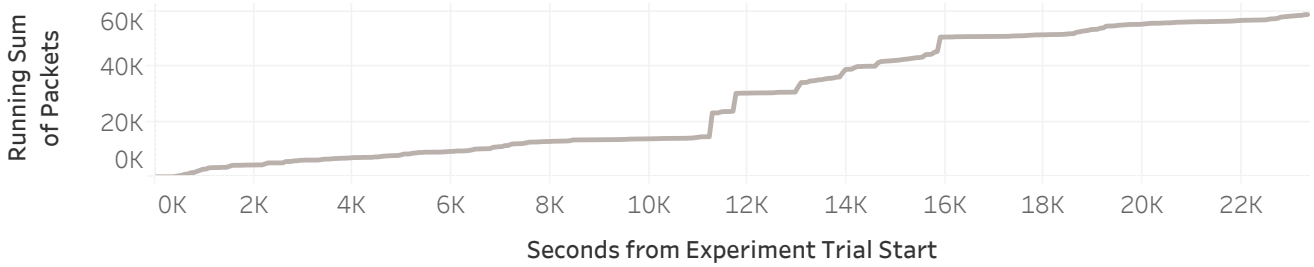
Real Packets per Minute



Real System Interaction Timeline

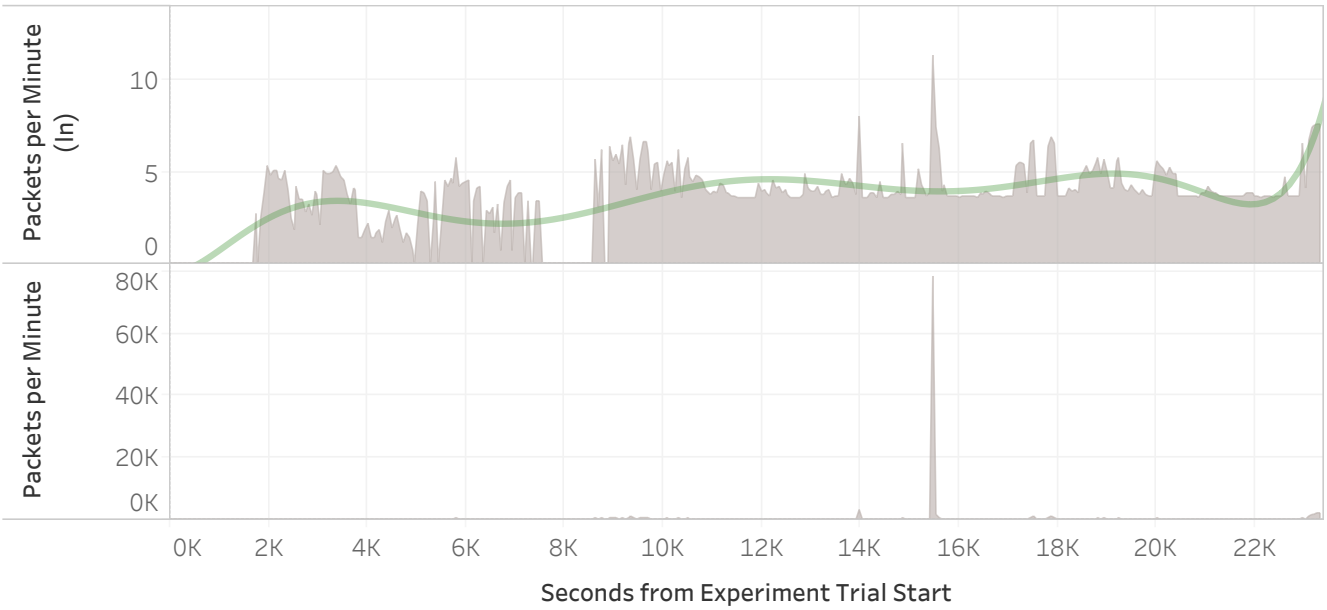


Running Sum of Packets

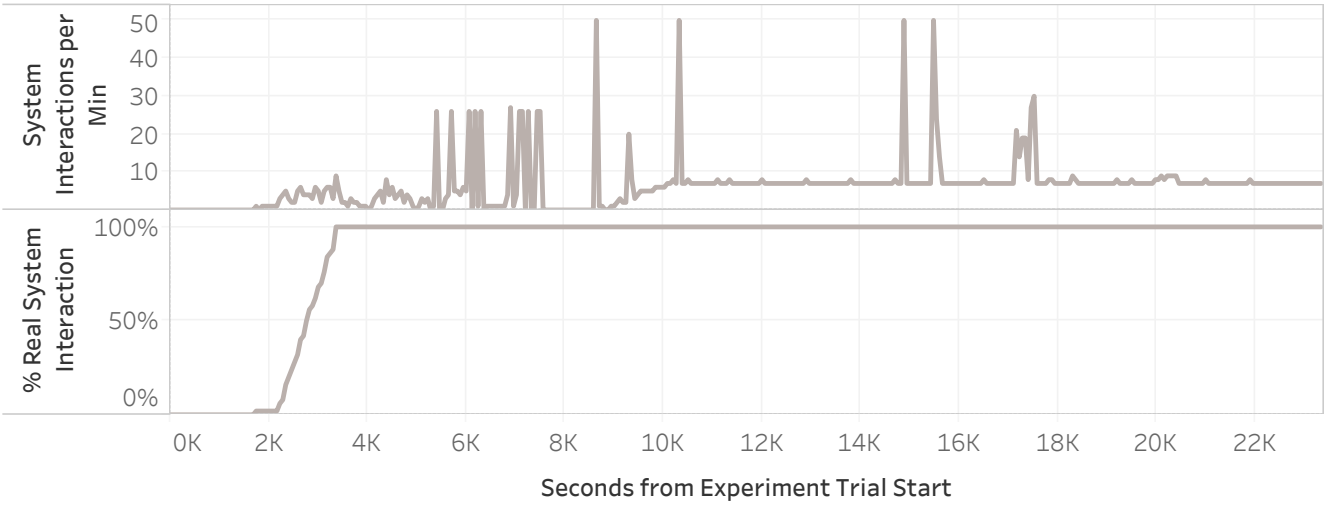


S79 - Day 1 - AU

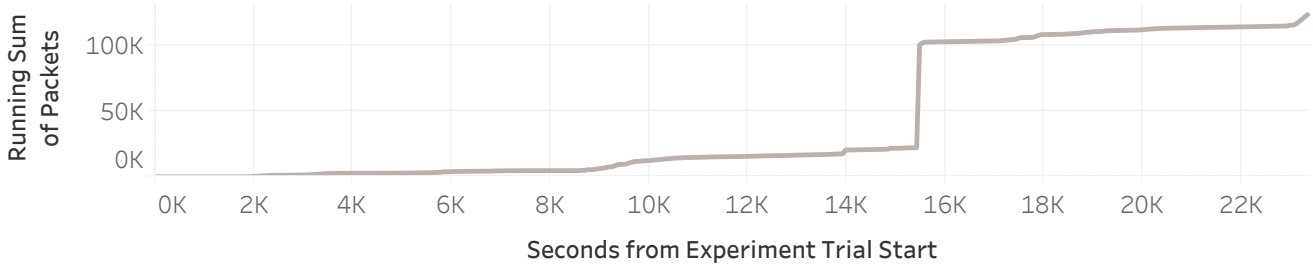
Real Packets per Minute



Real System Interaction Timeline

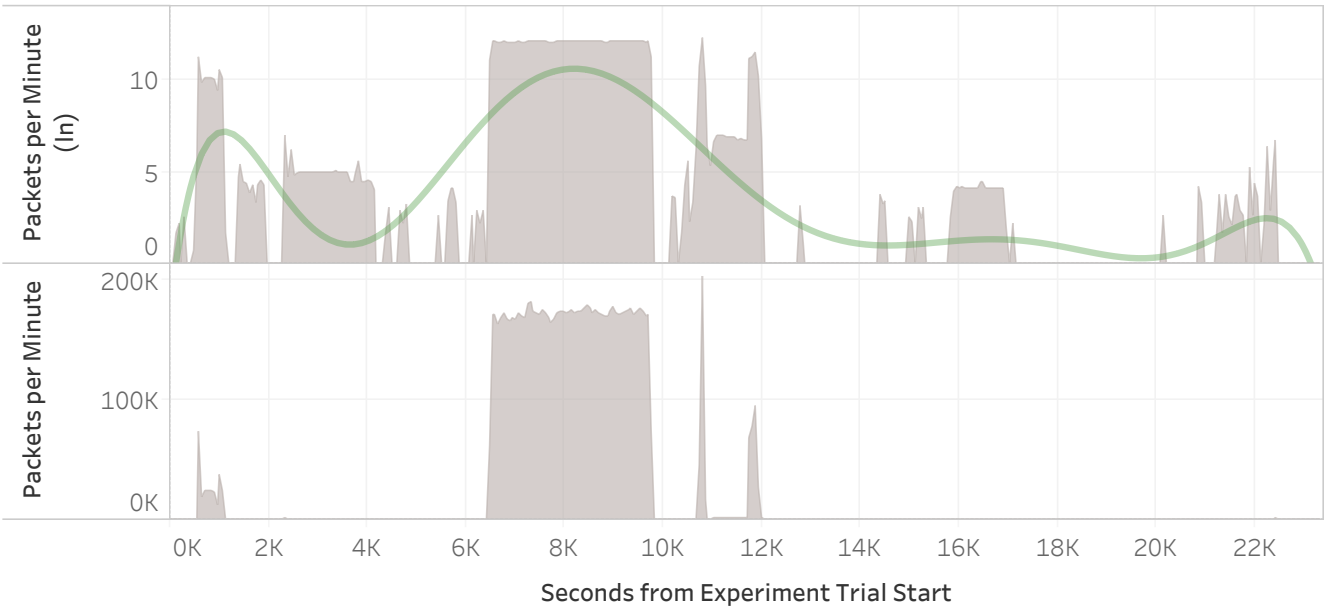


Running Sum of Packets

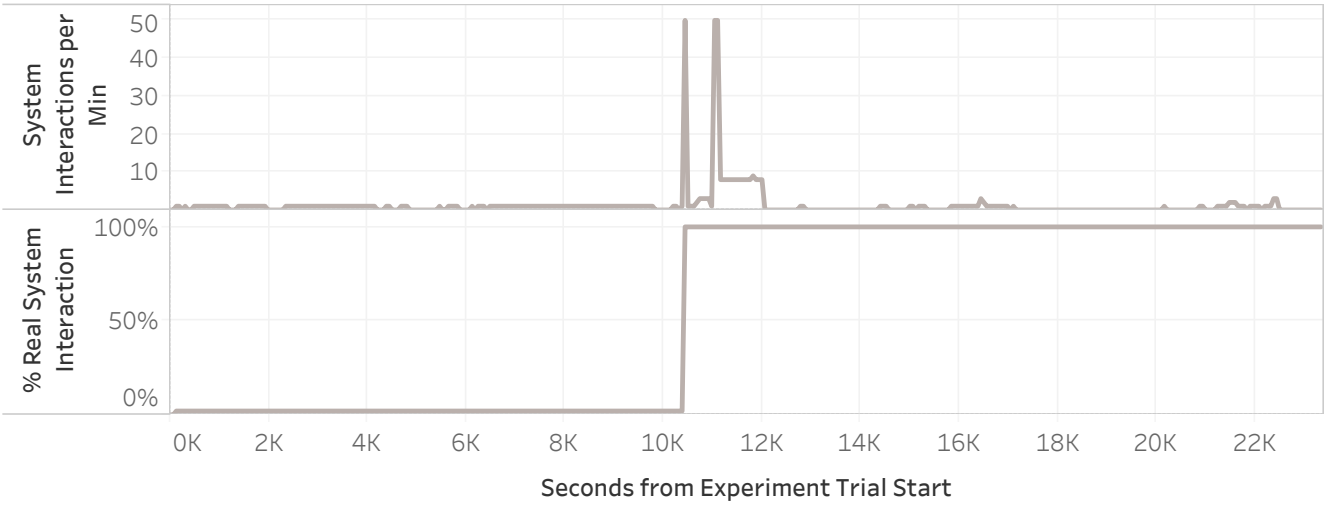


S80 - Day 1 - AU

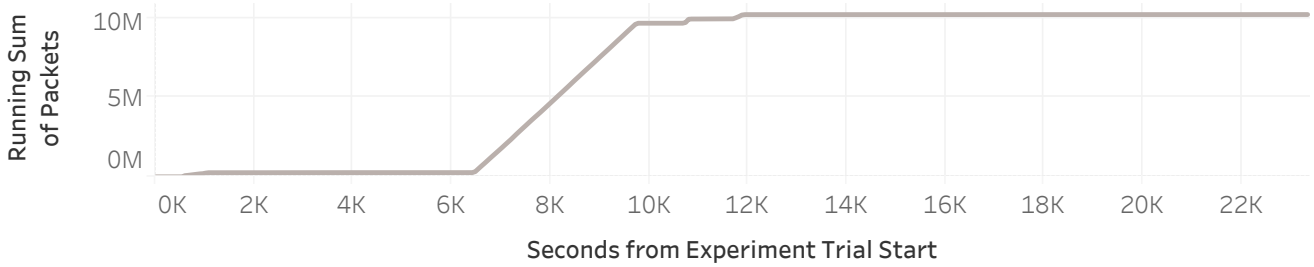
Real Packets per Minute



Real System Interaction Timeline



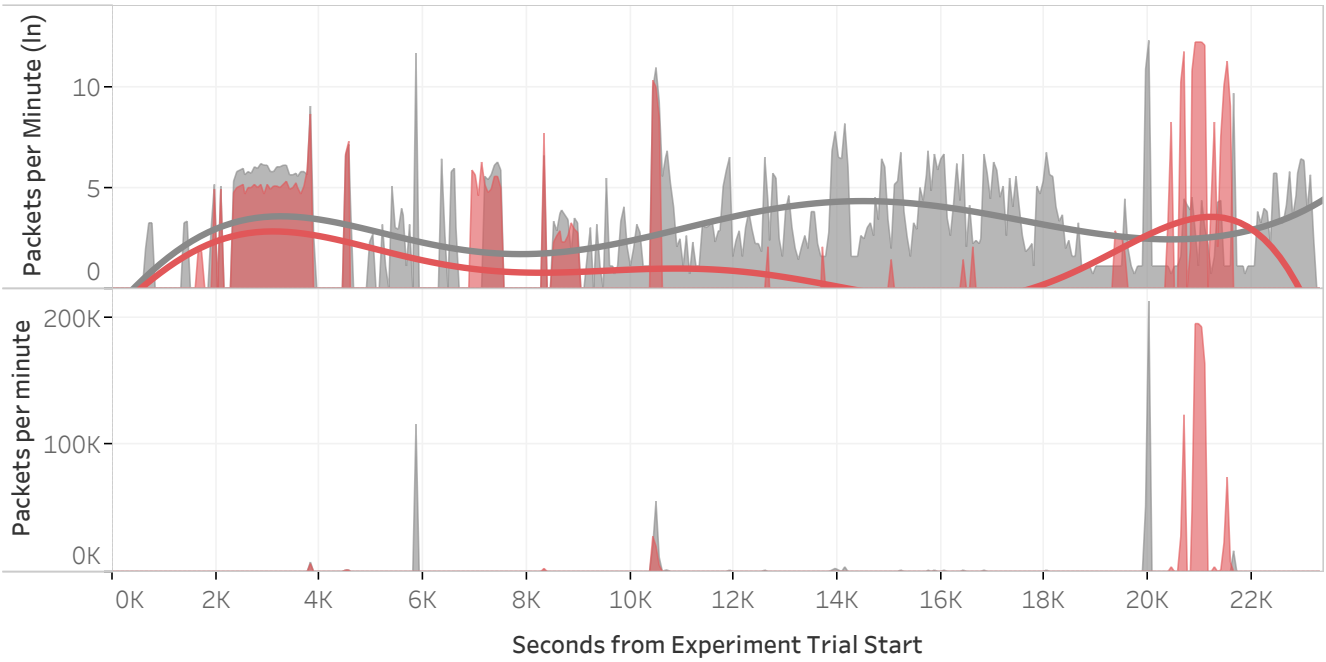
Running Sum of Packets



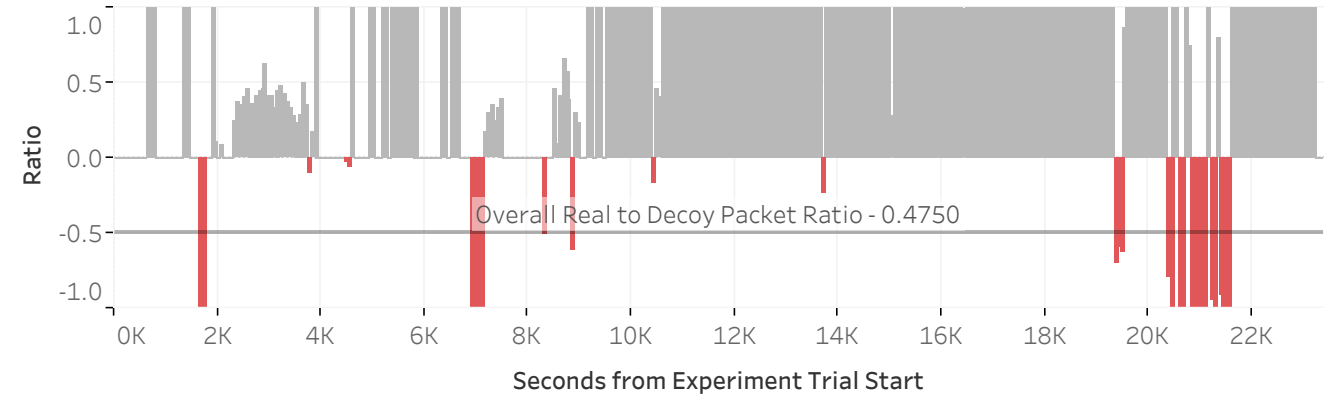
S81 - Day1 - PU

Legend
Real Systems
Decoy Systems

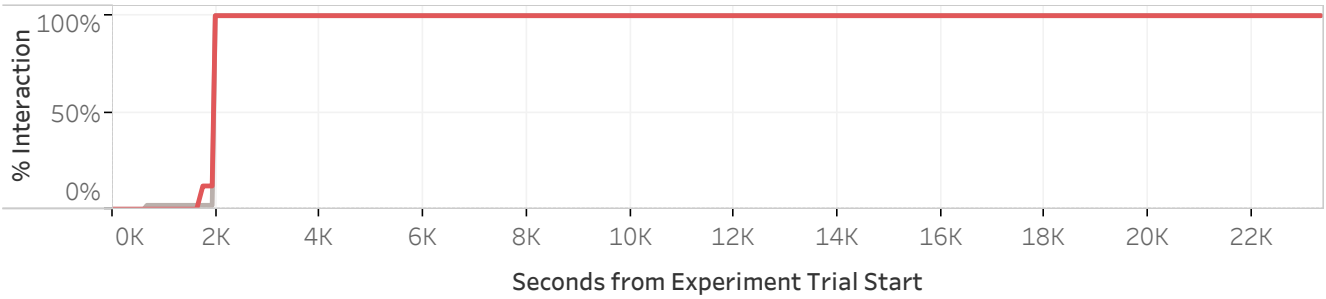
Real & Decoy Packets per Minute

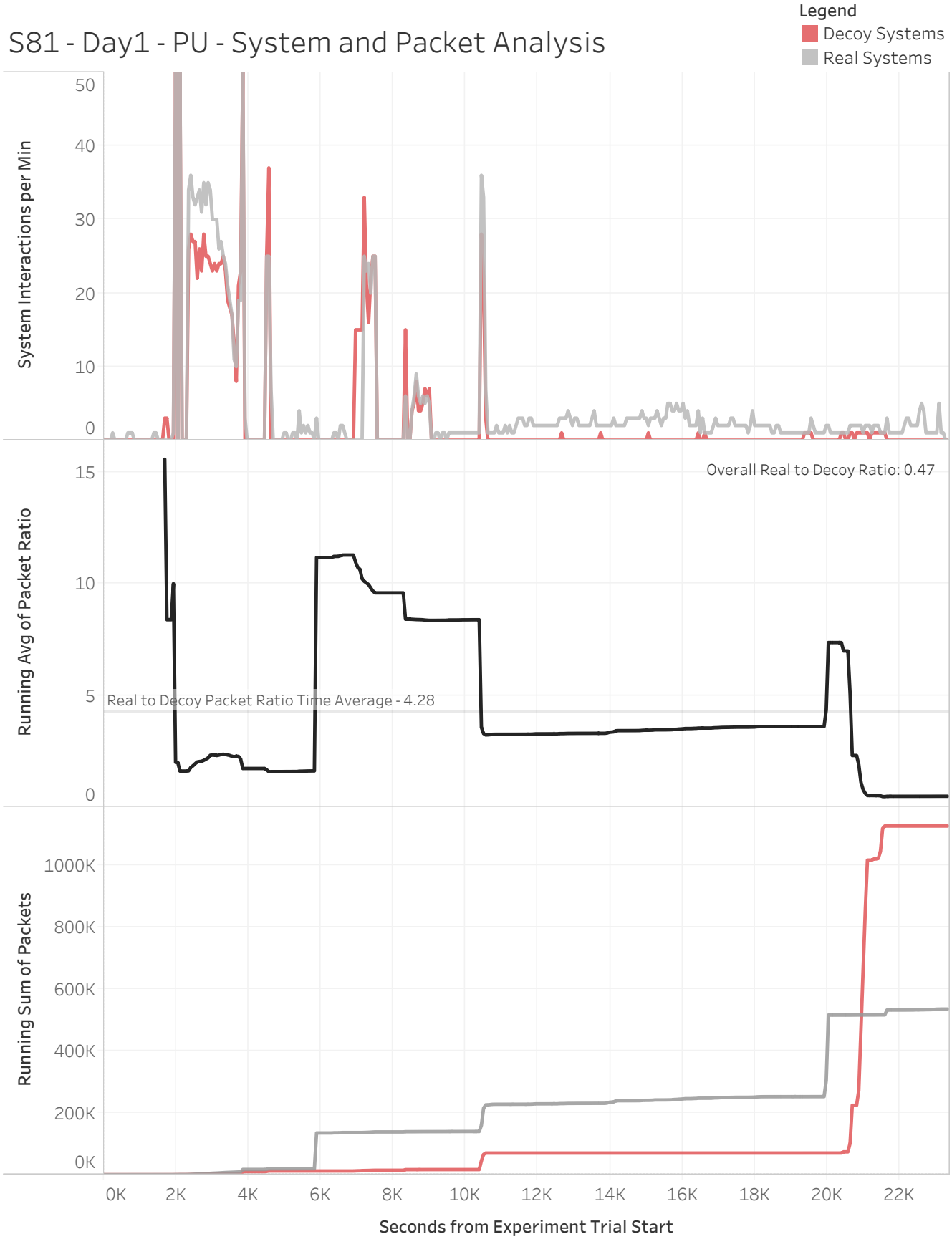


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

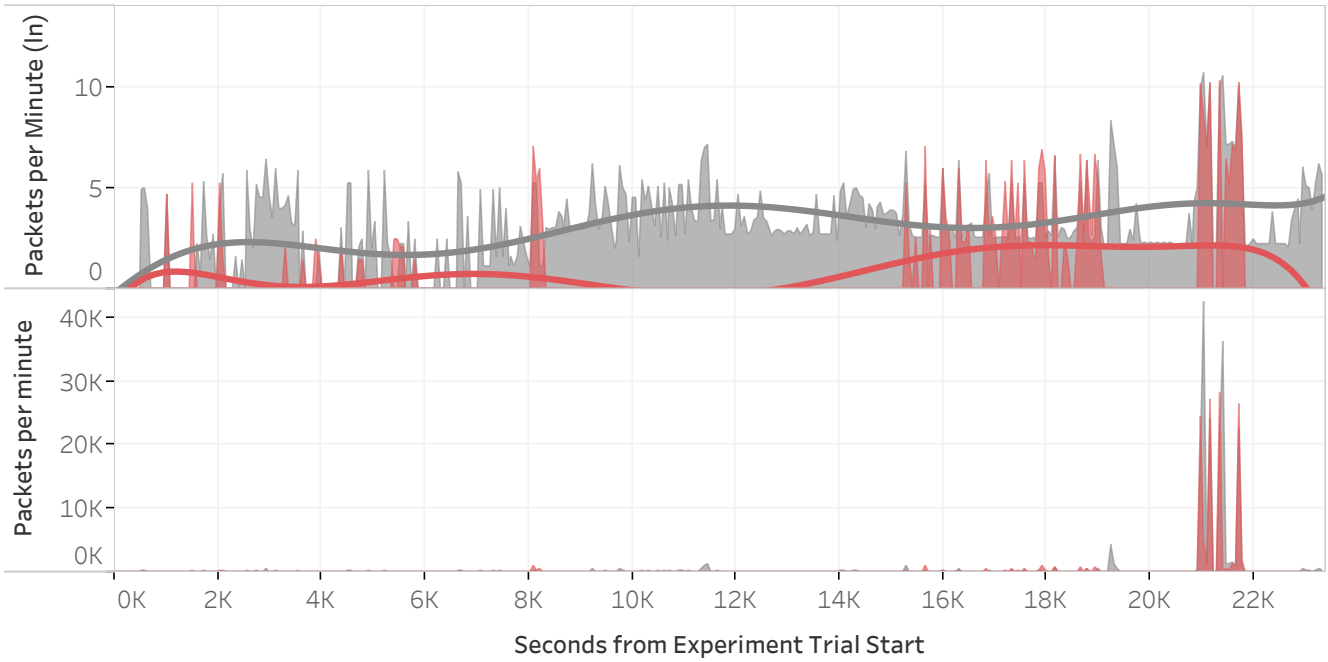



S81 - Day1 - PU - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
15
10
5
0
Overall Real to Decoy Ratio: 0.47
Real to Decoy Packet Ratio Time Average - 4.28
Running Sum of Packets
1000K
800K
600K
400K
200K
0K
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

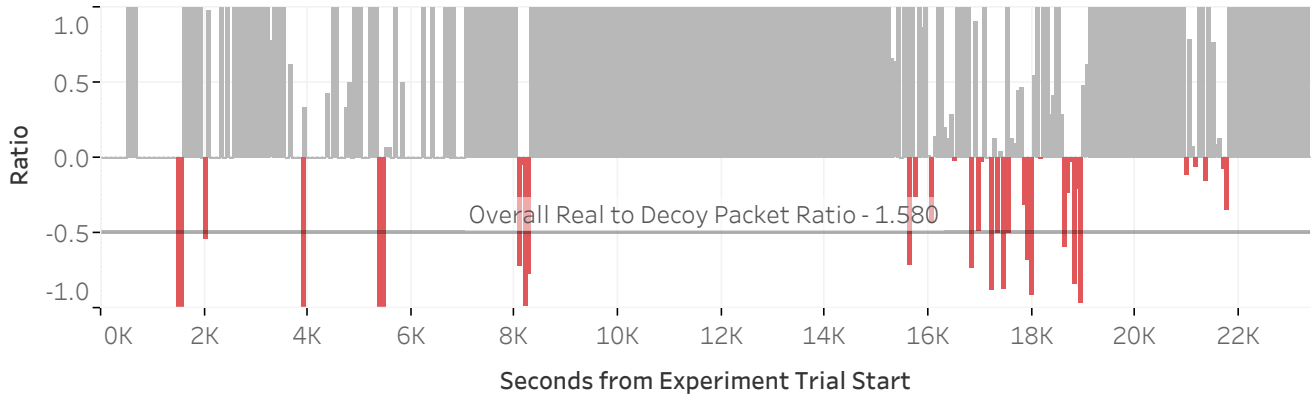
S82 - Day1 - PU

Legend
Real Systems
Decoy Systems

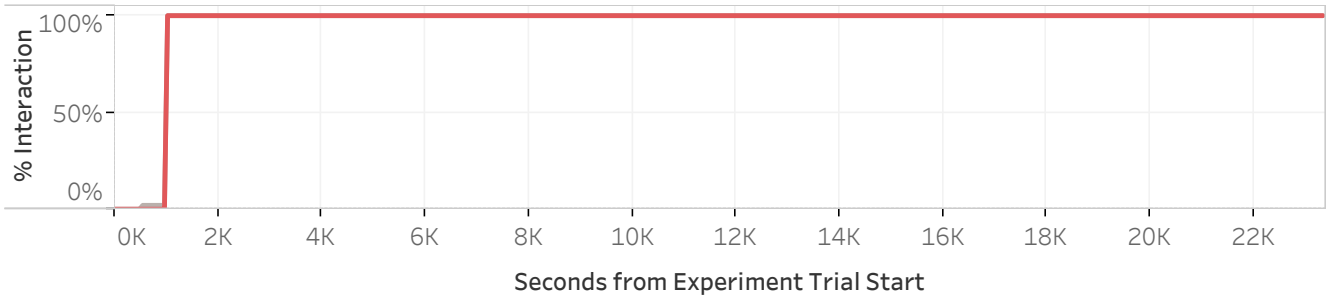
Real & Decoy Packets per Minute

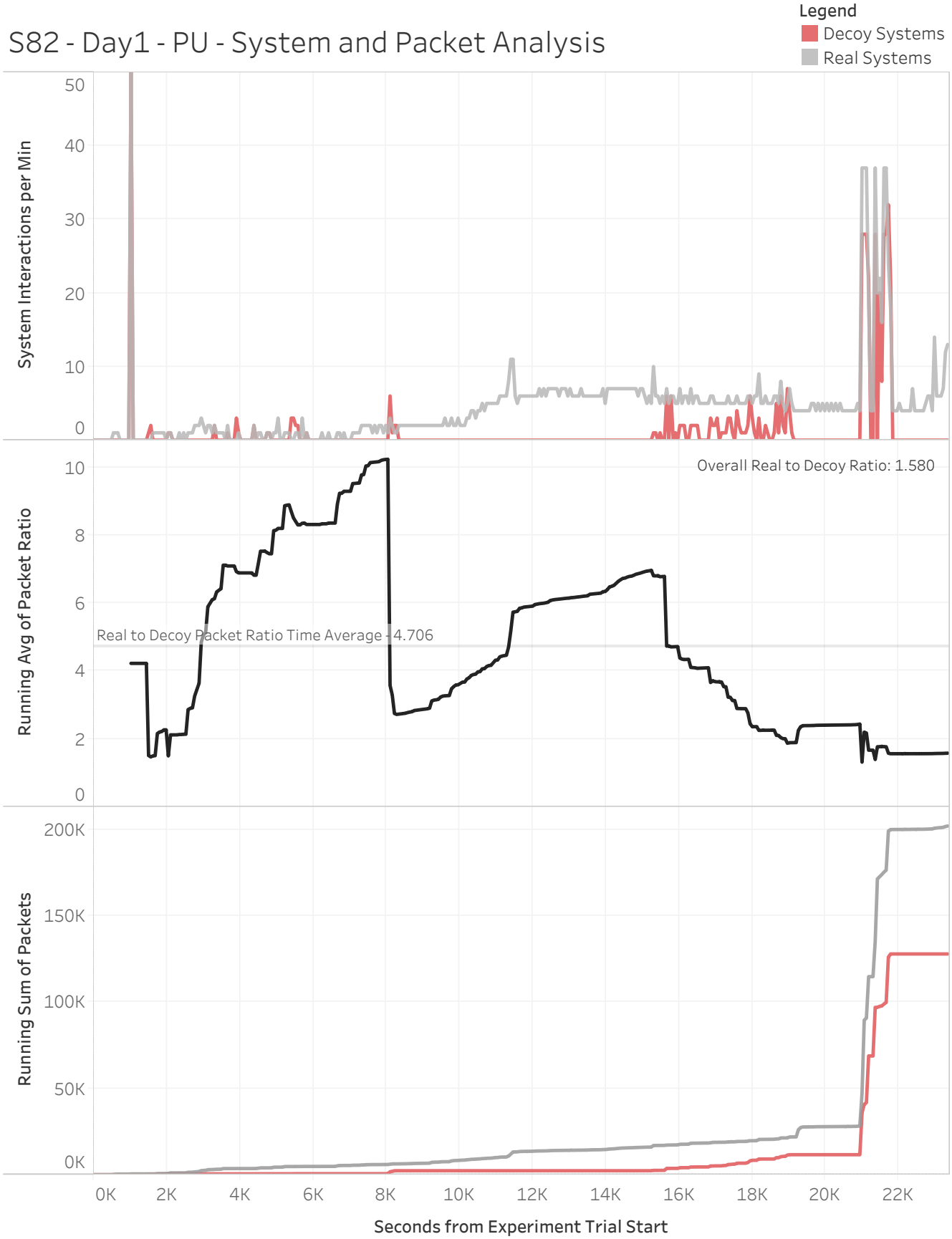


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

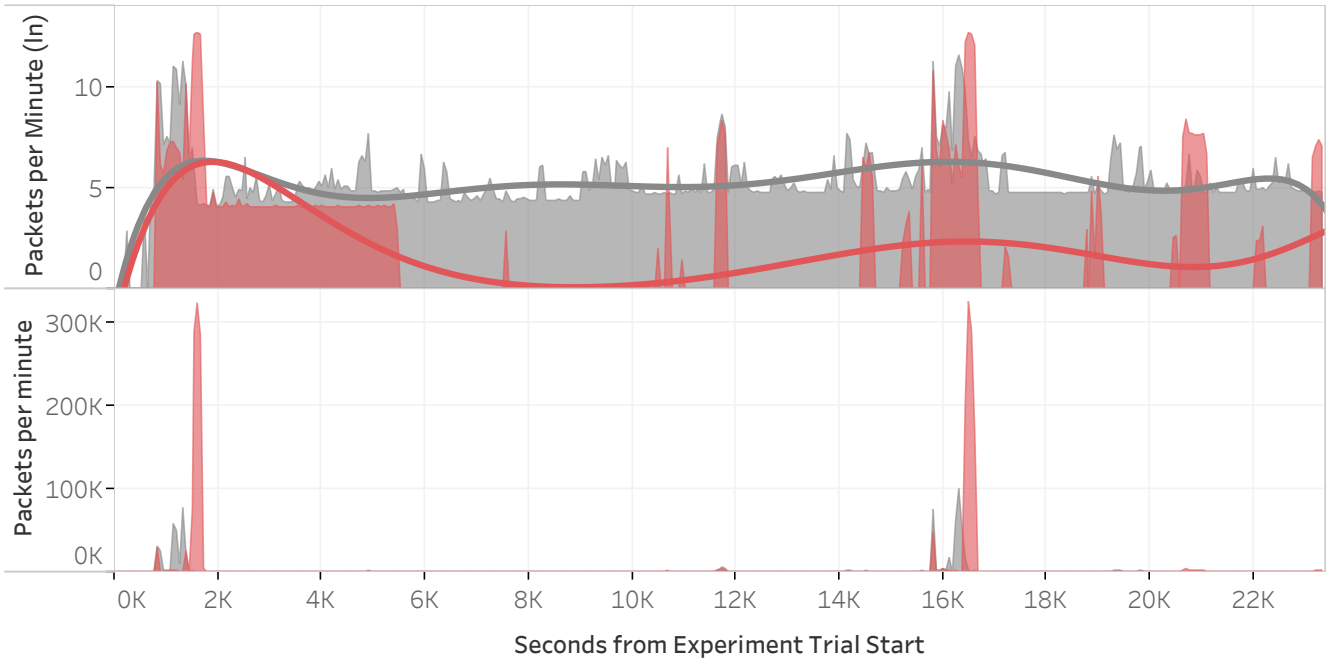



S82 - Day1 - PU - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
10
8
6
4
2
0
Overall Real to Decoy Ratio: 1.580
Real to Decoy Packet Ratio Time Average - 4.706
Running Sum of Packets
200K
150K
100K
50K
0K
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

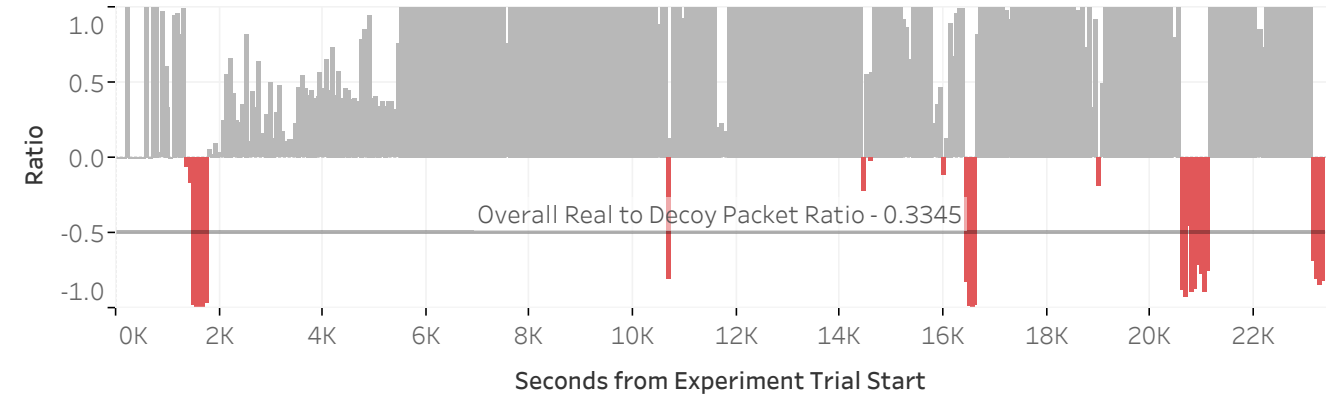
S83 - Day1 - PU

Legend
Real Systems
Decoy Systems

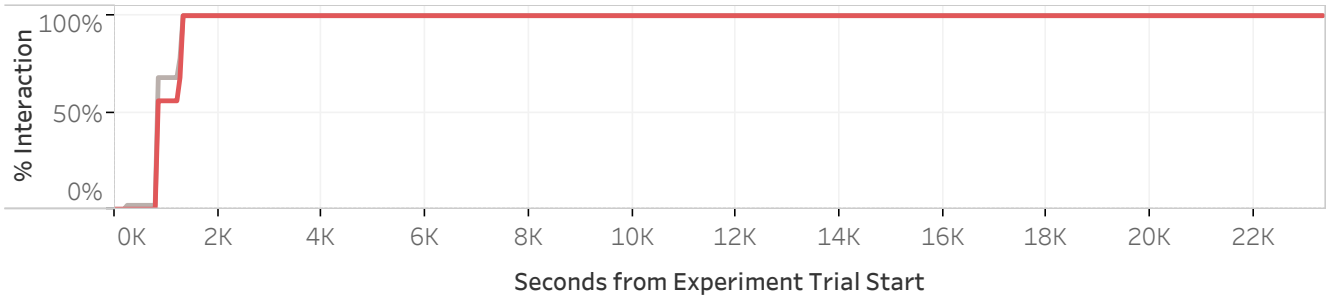
Real & Decoy Packets per Minute

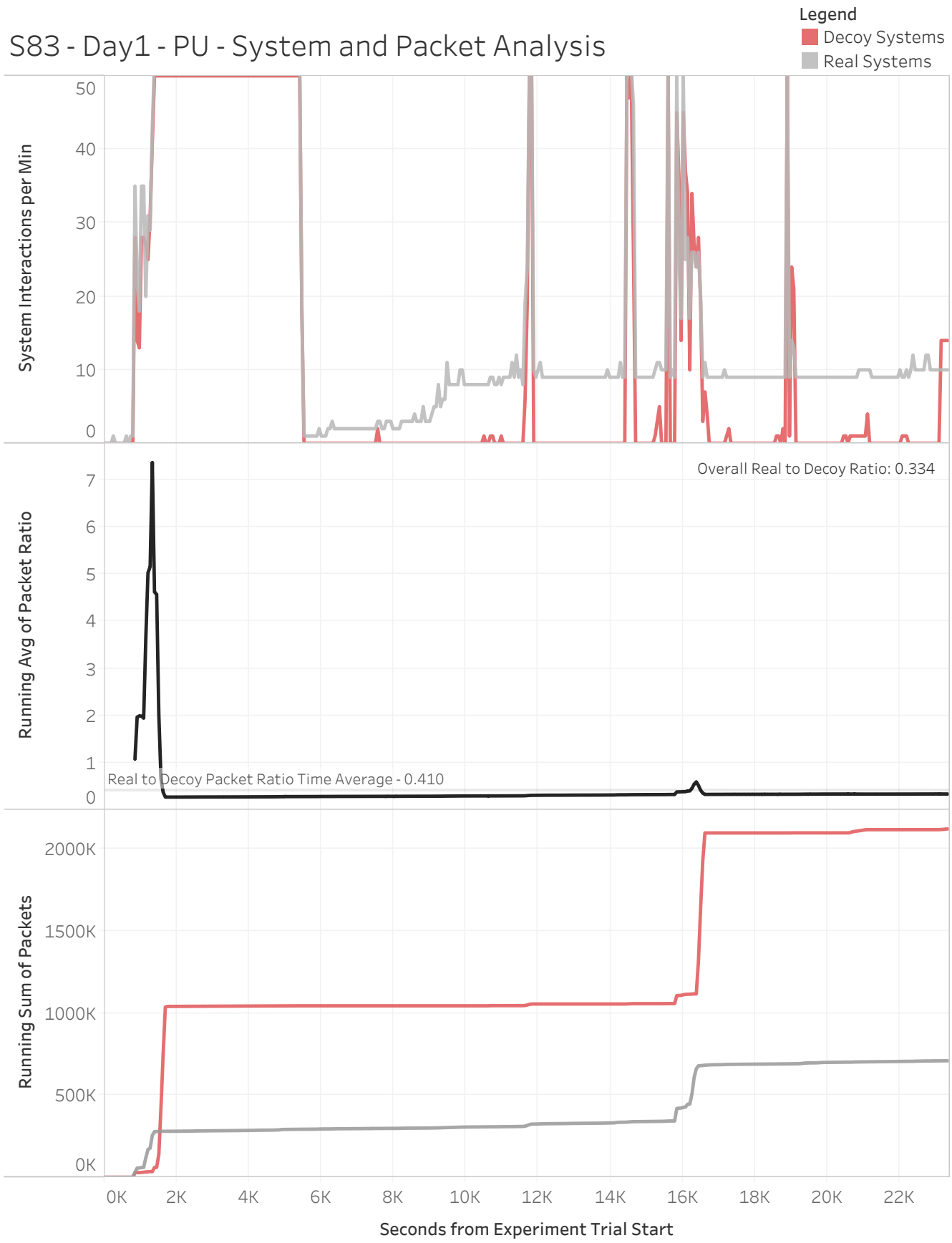


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

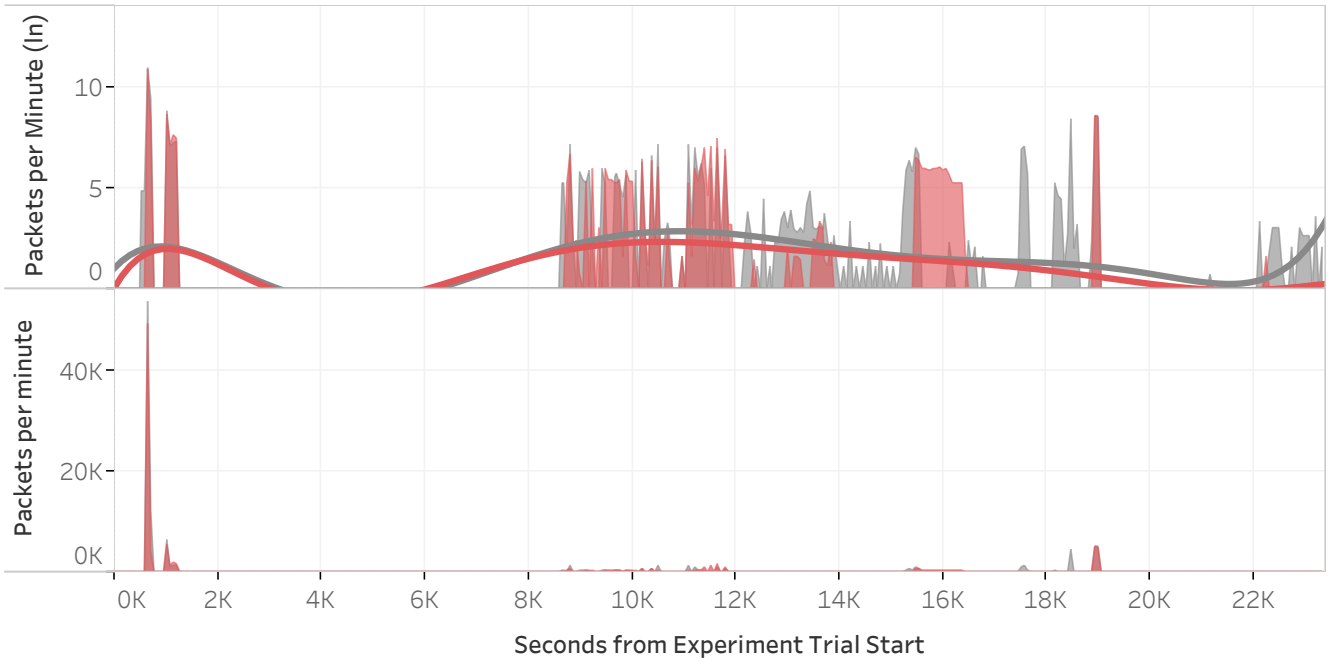



S83 - Day1 - PU - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
7
6
5
4
3
2
1
0
Overall Real to Decoy Ratio: 0.334
Real to Decoy Packet Ratio Time Average - 0.410
Running Sum of Packets
2000K
1500K
1000K
500K
0K
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

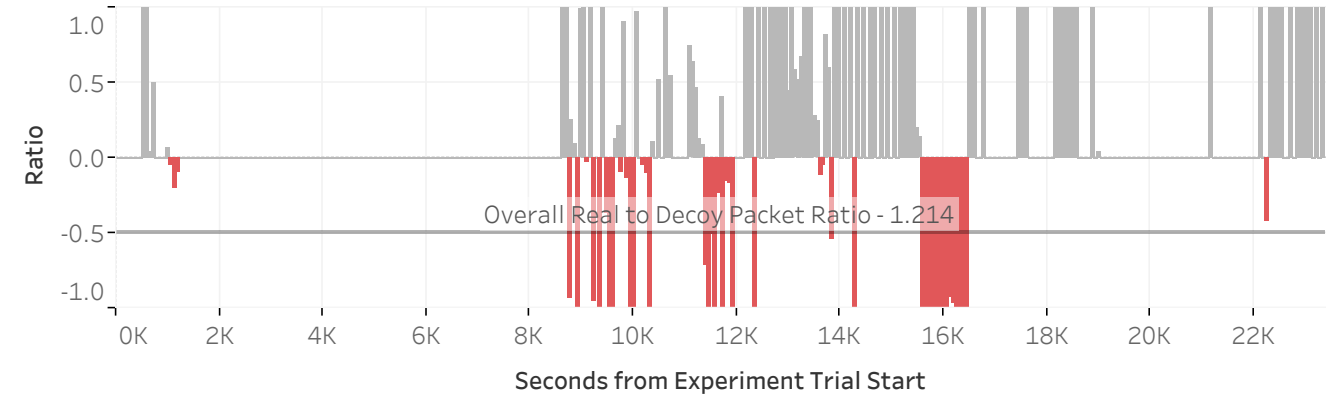
S84 - Day1 - PU

Legend
Real Systems
Decoy Systems

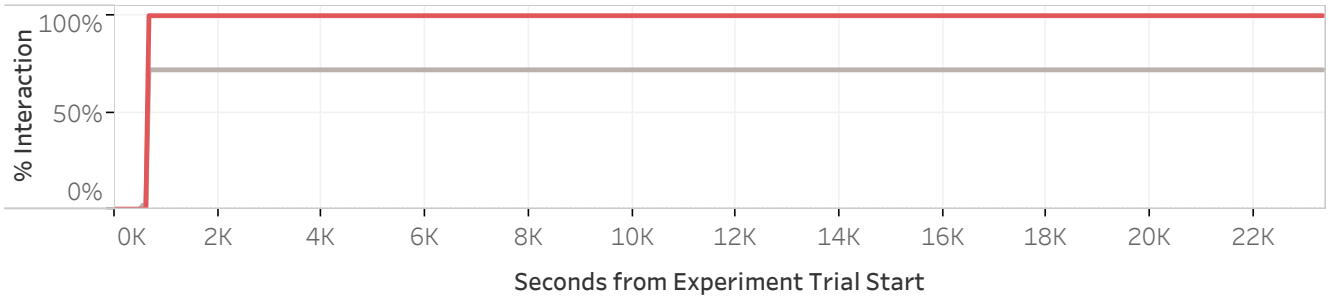
Real & Decoy Packets per Minute

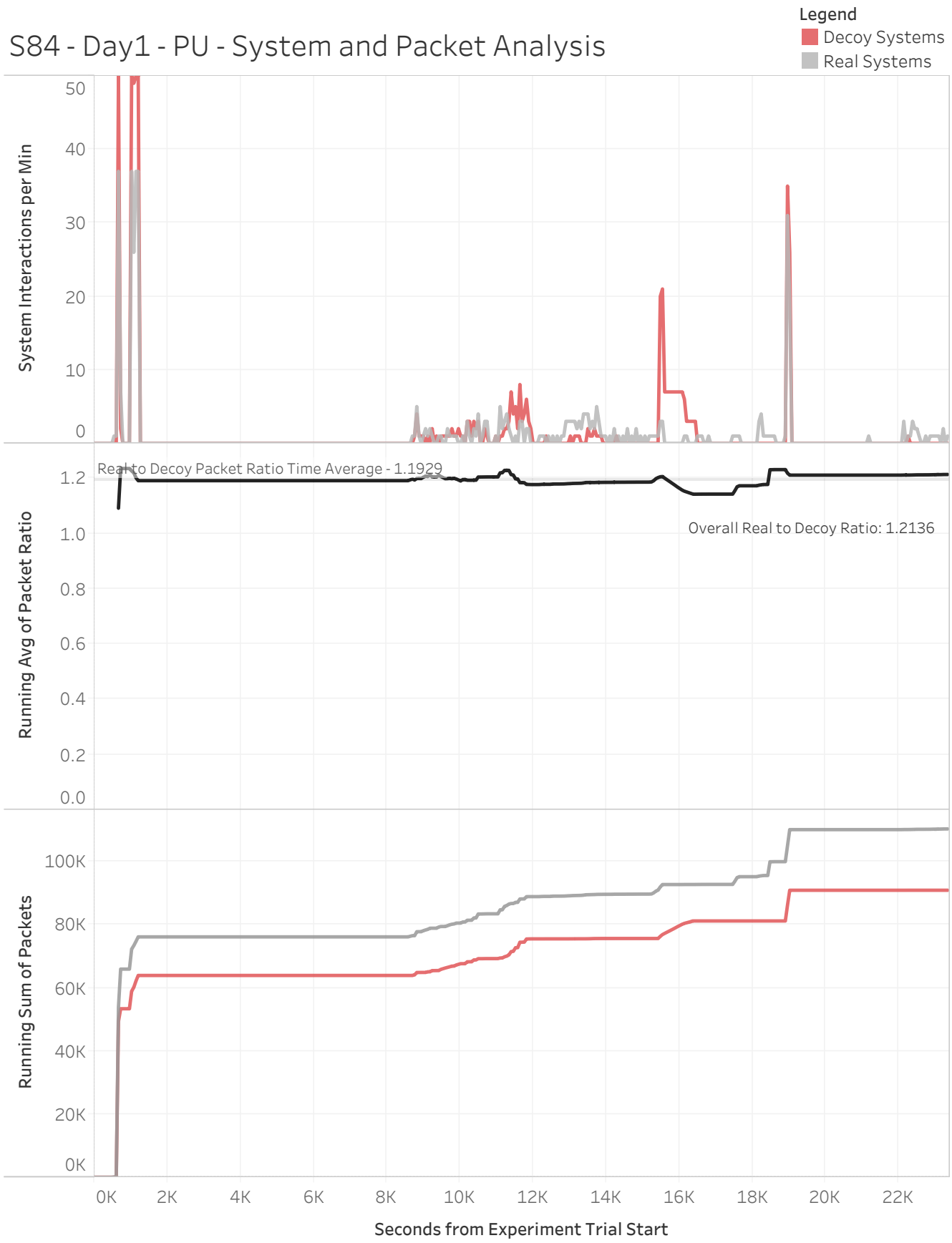


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

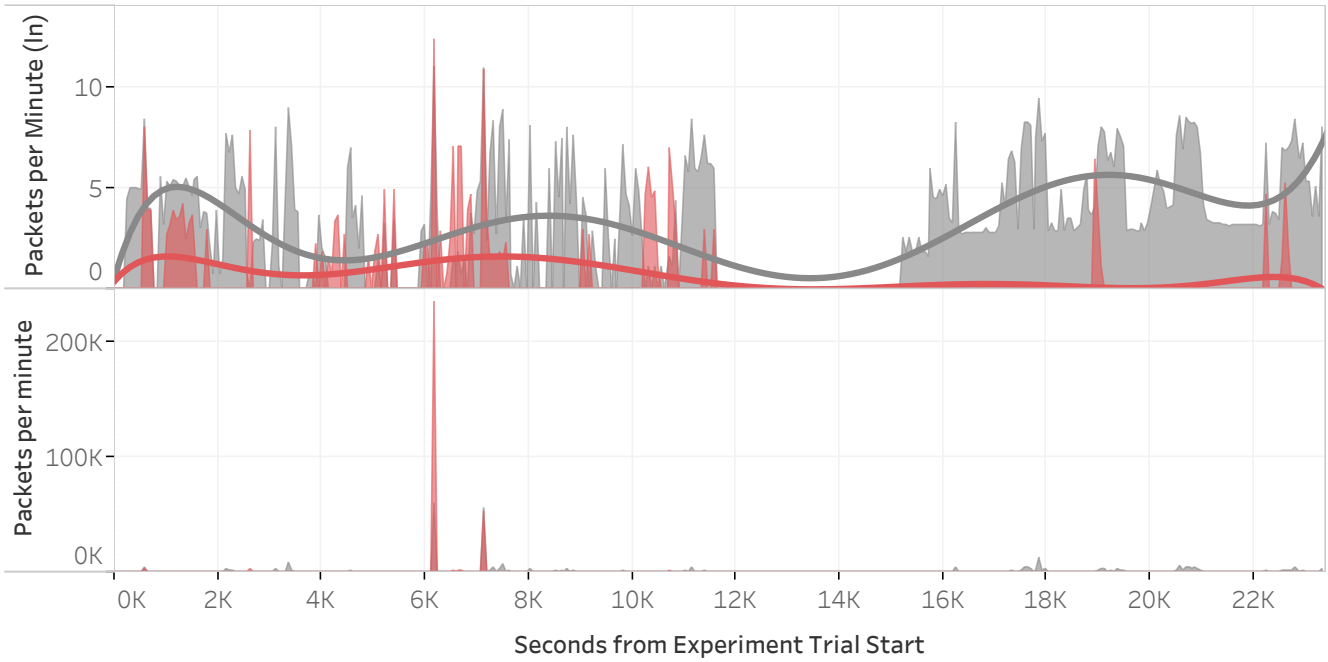



S84 - Day1 - PU - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Real to Decoy Packet Ratio Time Average - 1.1929
Overall Real to Decoy Ratio: 1.2136
Running Avg of Packet Ratio
1.2
1.0
0.8
0.6
0.4
0.2
0.0
Running Sum of Packets
100K
80K
60K
40K
20K
0K
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

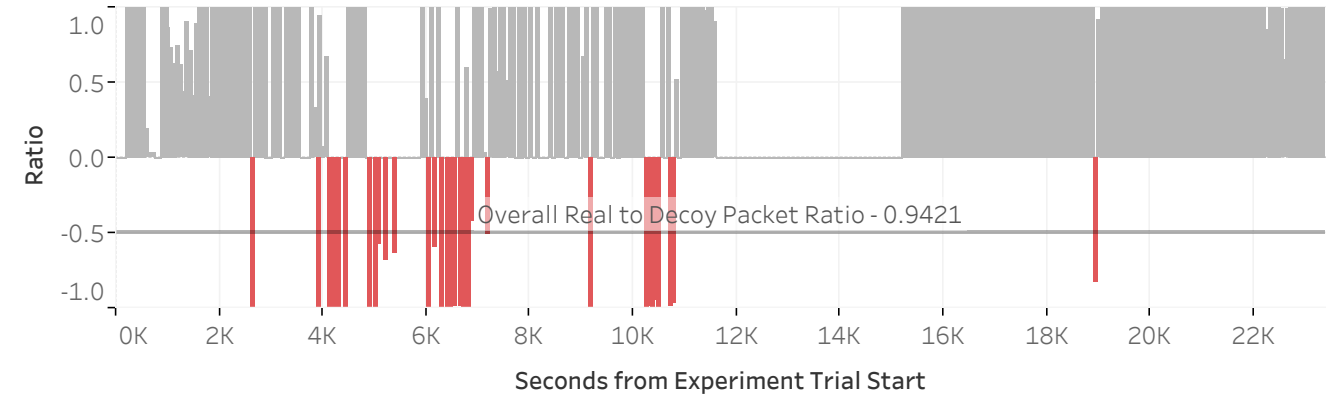
S85 - Day1 - PU

Legend
Real Systems
Decoy Systems

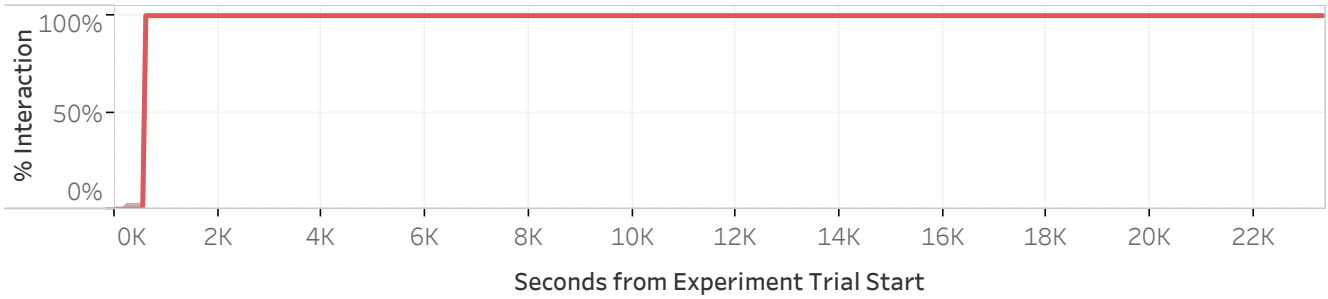
Real & Decoy Packets per Minute

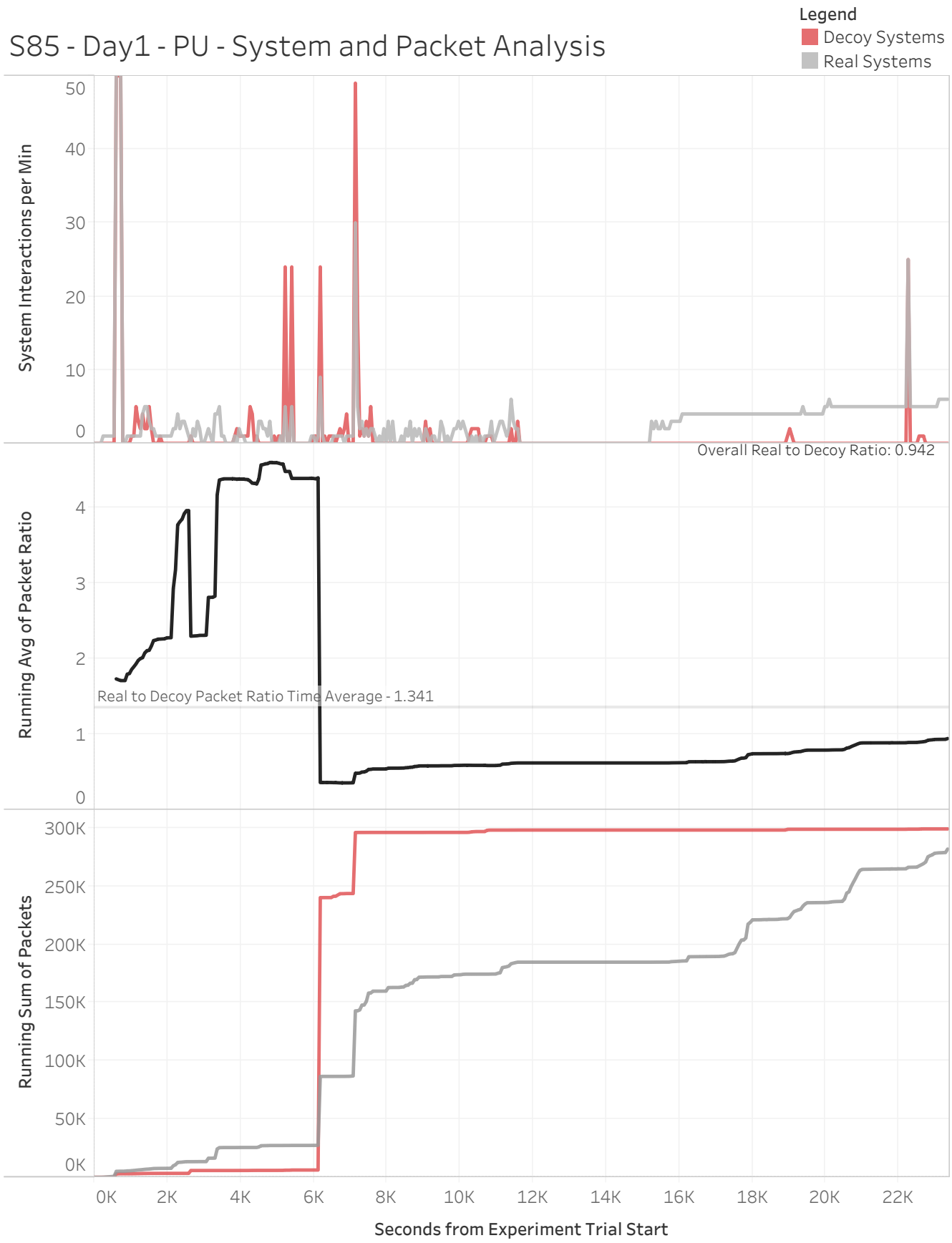


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

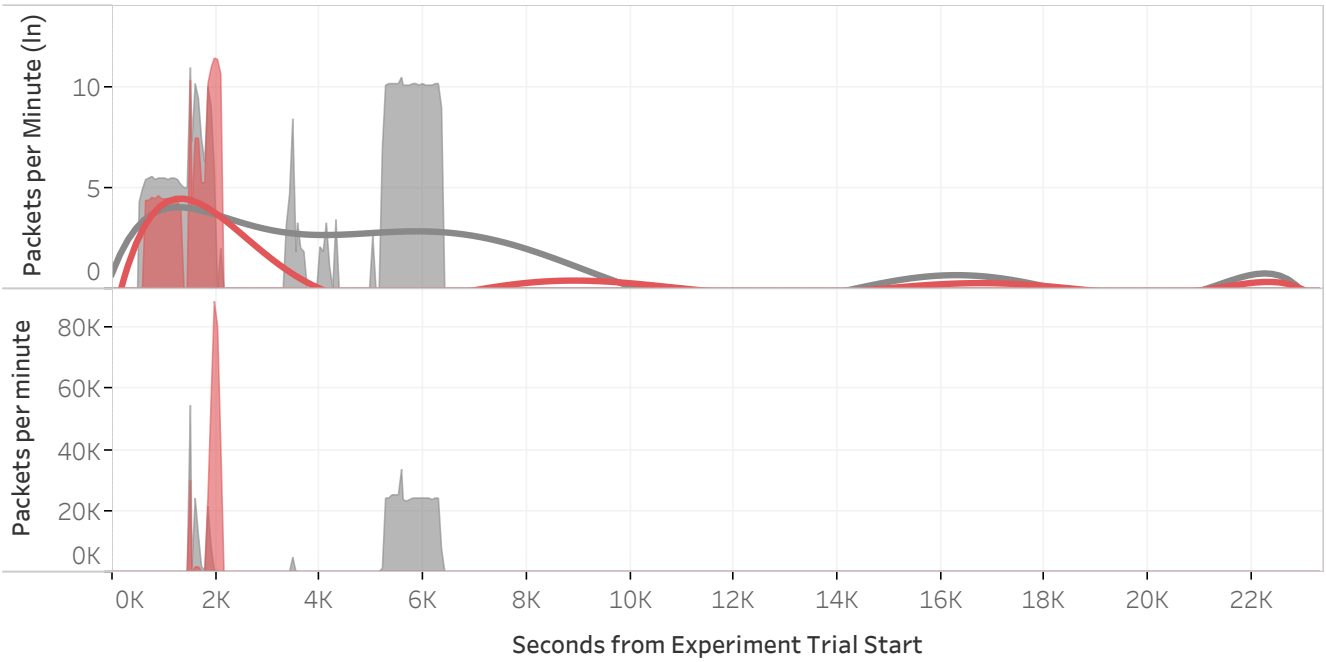



S85 - Day1 - PU - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Overall Real to Decoy Ratio: 0.942
Running Avg of Packet Ratio
4
3
2
1
0
Real to Decoy Packet Ratio Time Average - 1.341
Running Sum of Packets
300K
250K
200K
150K
100K
50K
0K
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

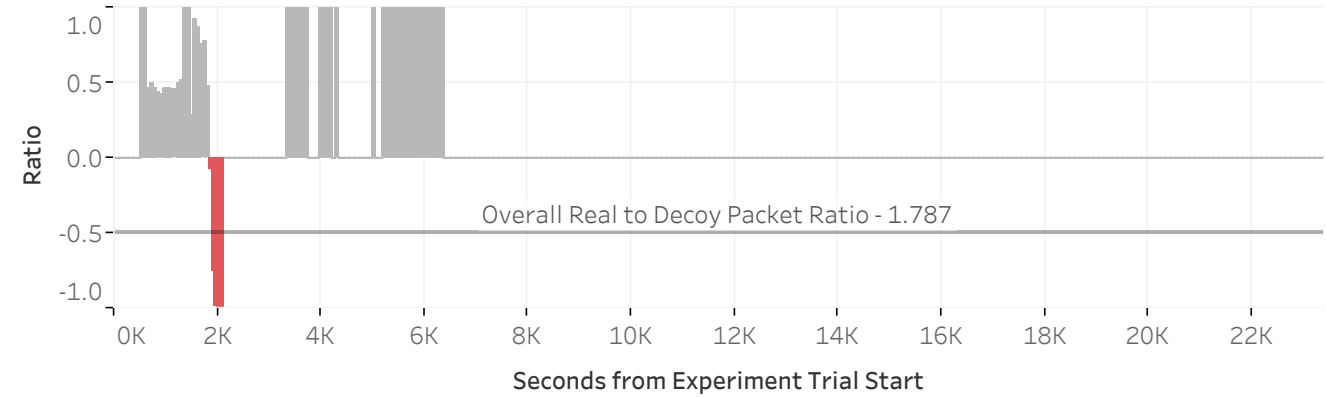
S86 - Day1 - PU

Legend
Real Systems
Decoy Systems

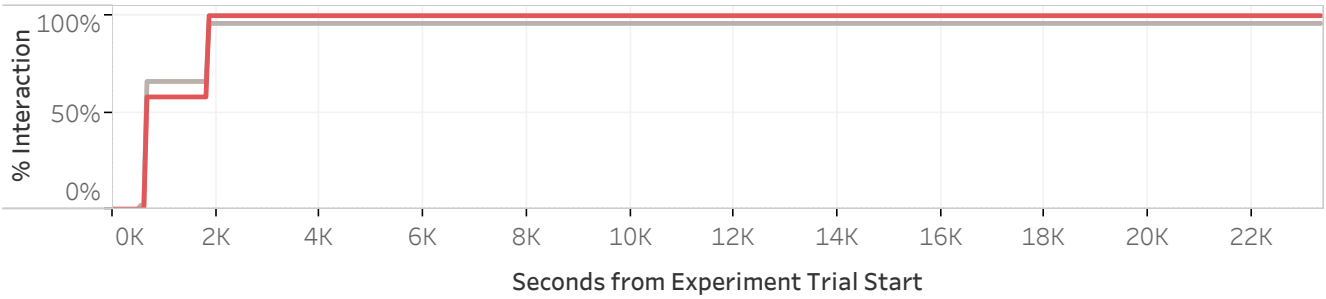
Real & Decoy Packets per Minute

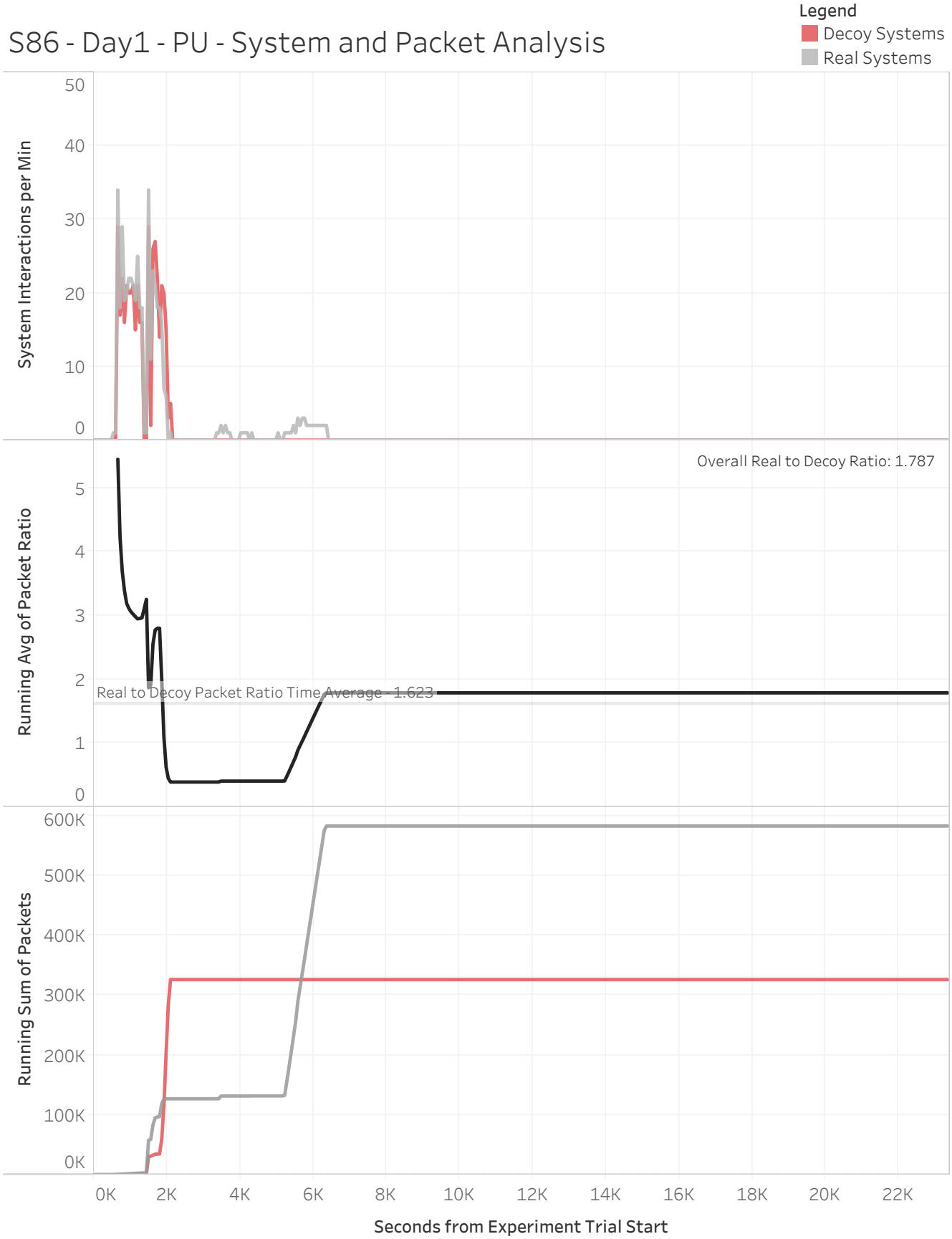


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

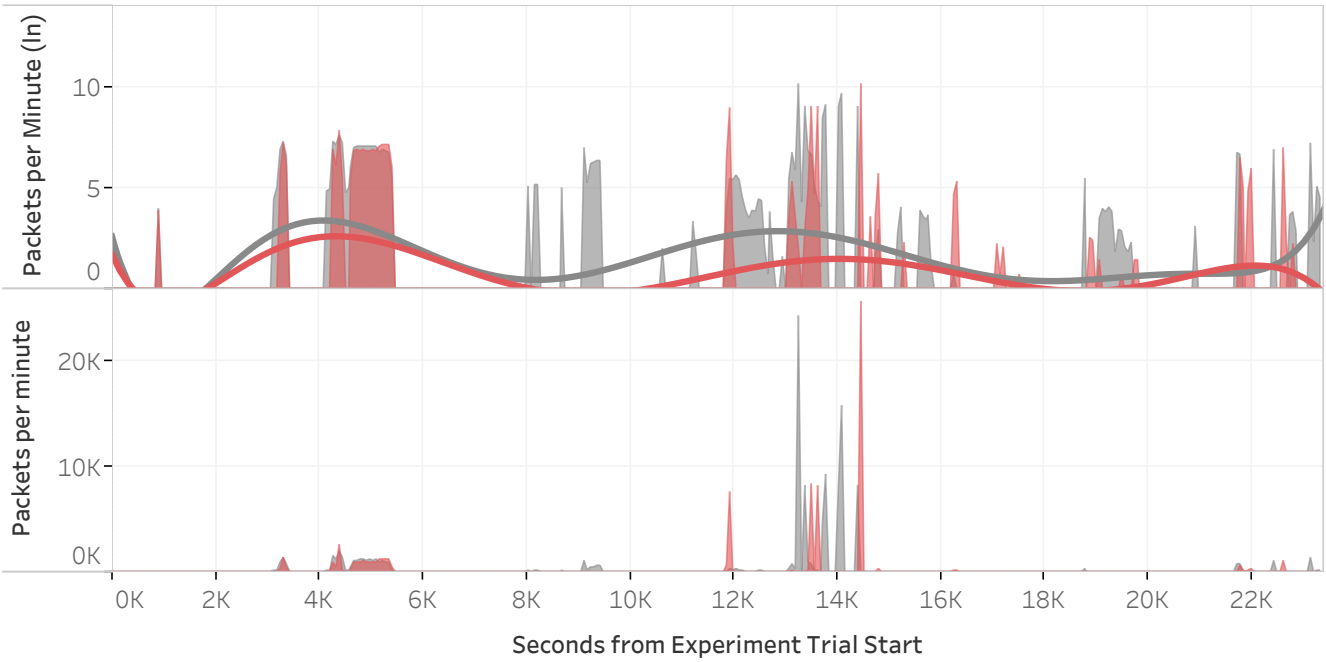



S86 - Day1 - PU - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
Overall Real to Decoy Ratio: 1.787
5
4
3
2
1
0
Real to Decoy Packet Ratio Time Average: 1.623
Running Sum of Packets
600K
500K
400K
300K
200K
100K
0K
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

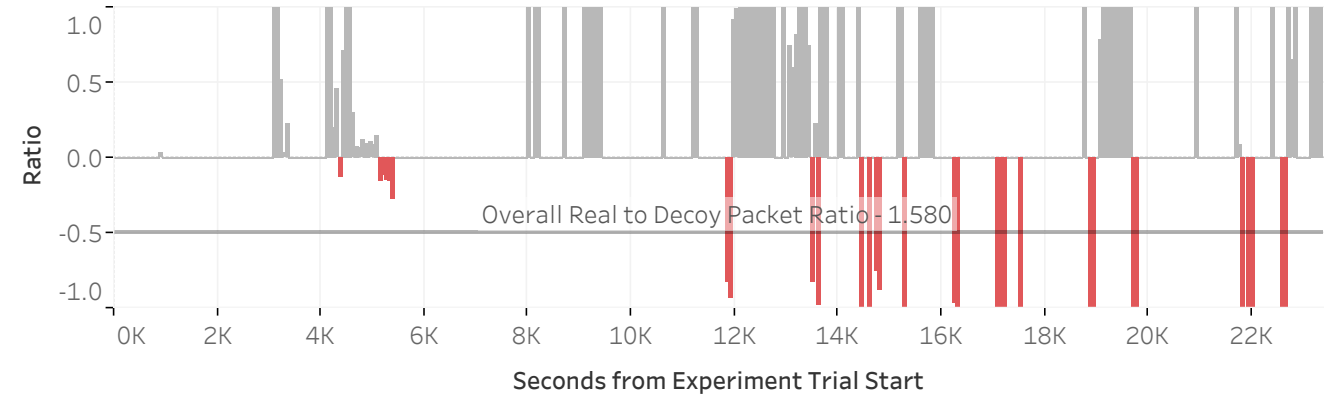
S87 - Day1 - PU

Legend
Real Systems
Decoy Systems

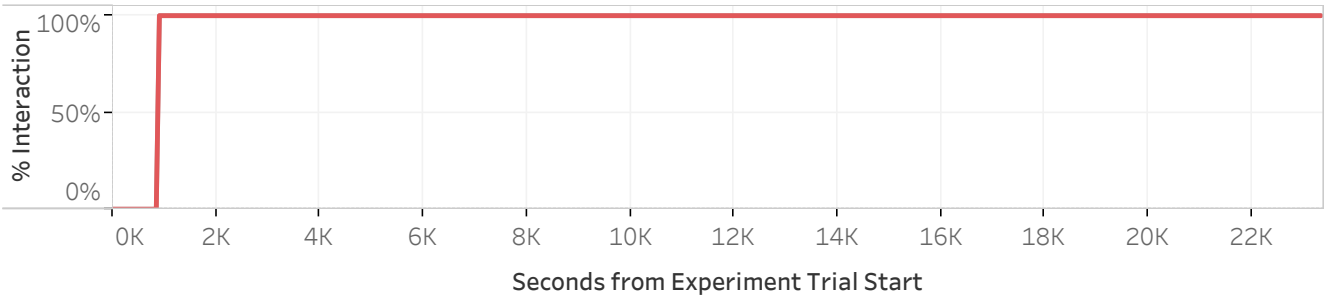
Real & Decoy Packets per Minute

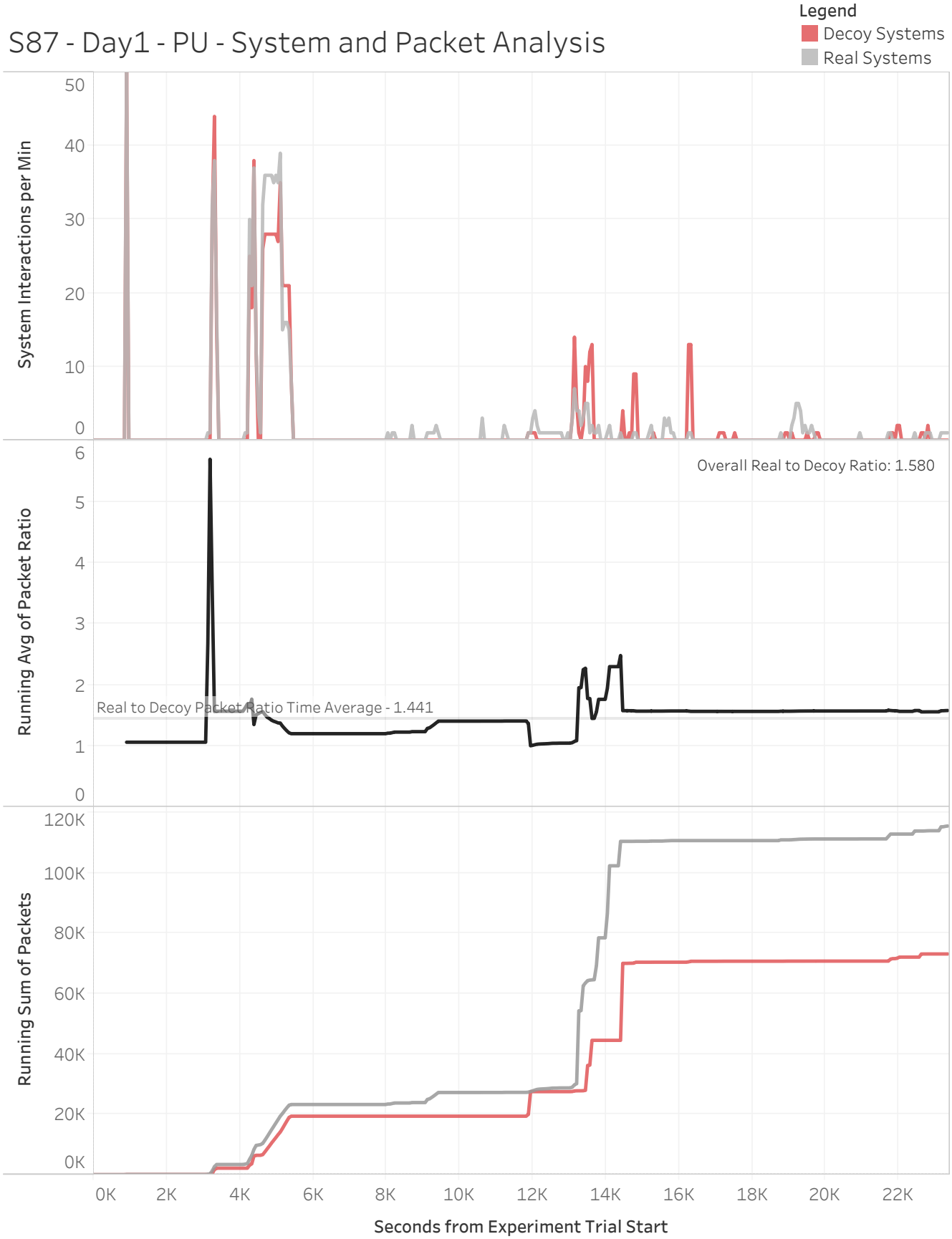


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

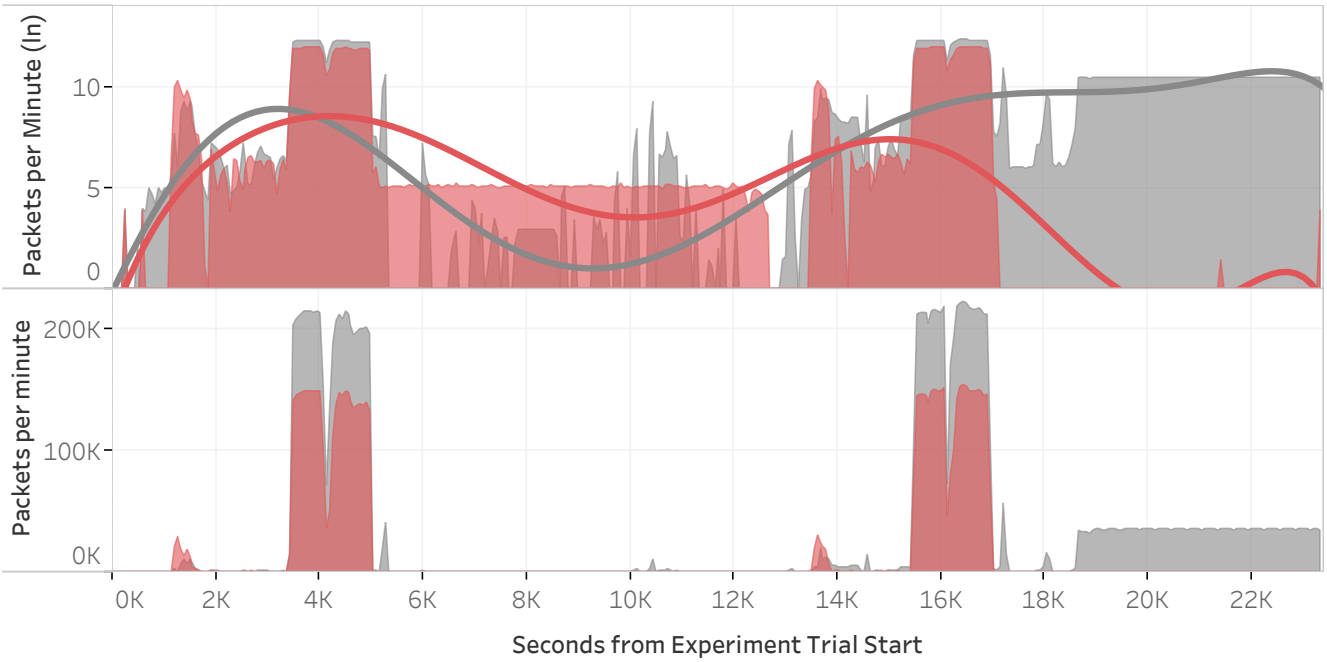



S87 - Day1 - PU - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
6
5
4
3
2
1
0
Overall Real to Decoy Ratio: 1.580
Real to Decoy Packet Ratio Time Average - 1.441
Running Sum of Packets
120K
100K
80K
60K
40K
20K
0K
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

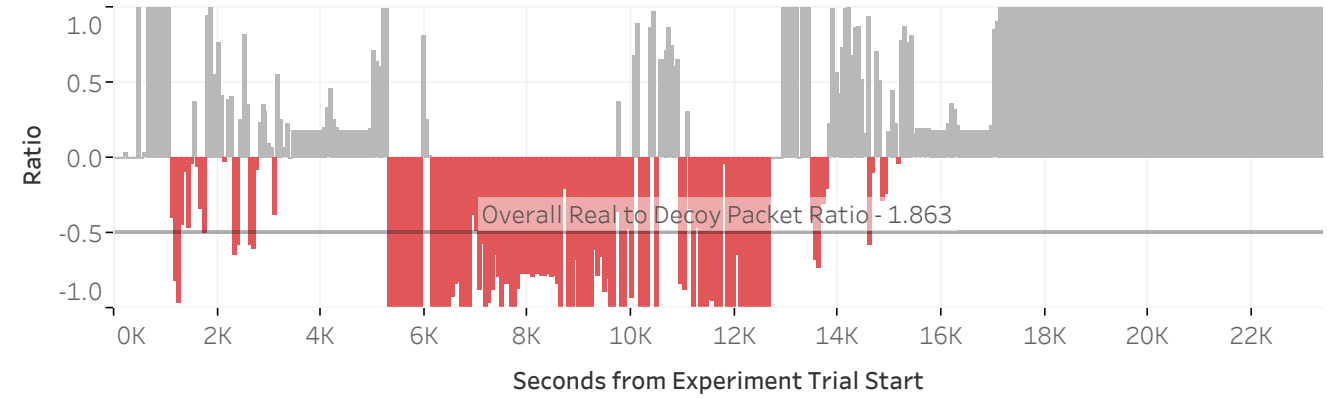
S88 - Day1 - PU

Legend
Real Systems
Decoy Systems

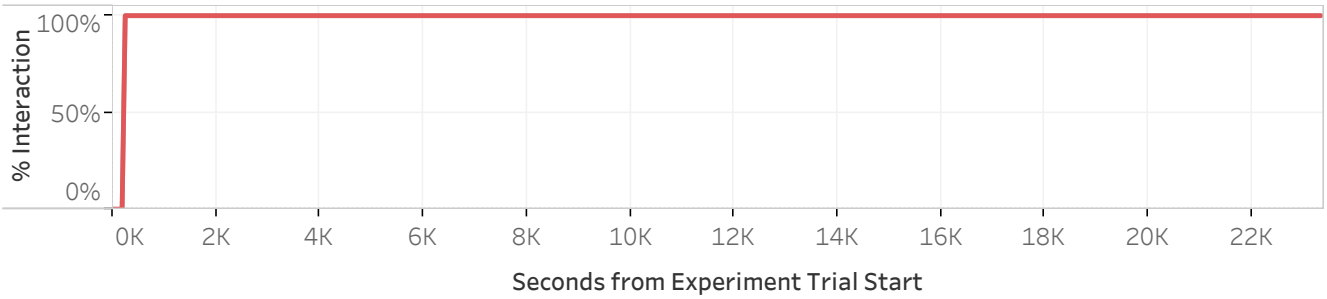
Real & Decoy Packets per Minute

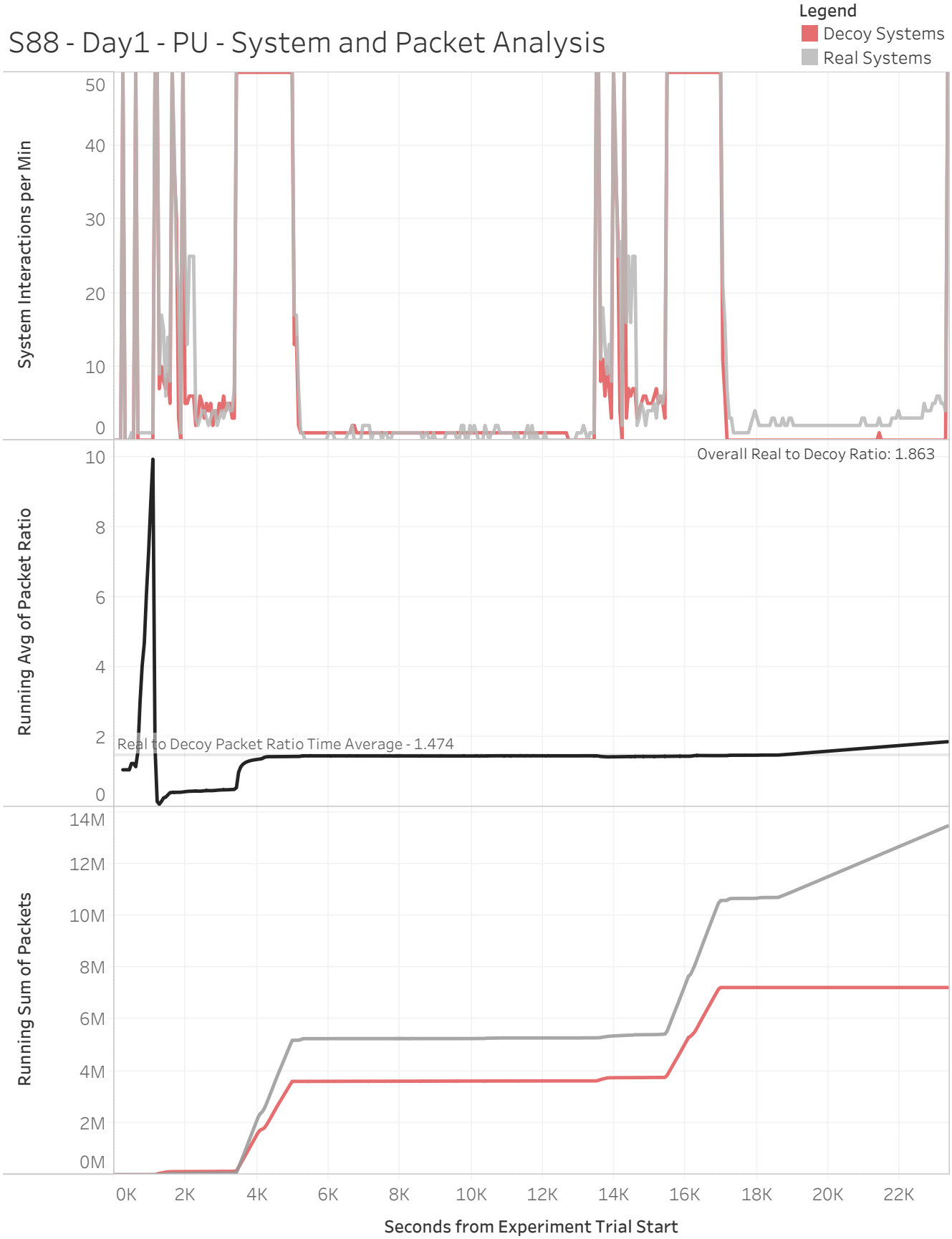


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

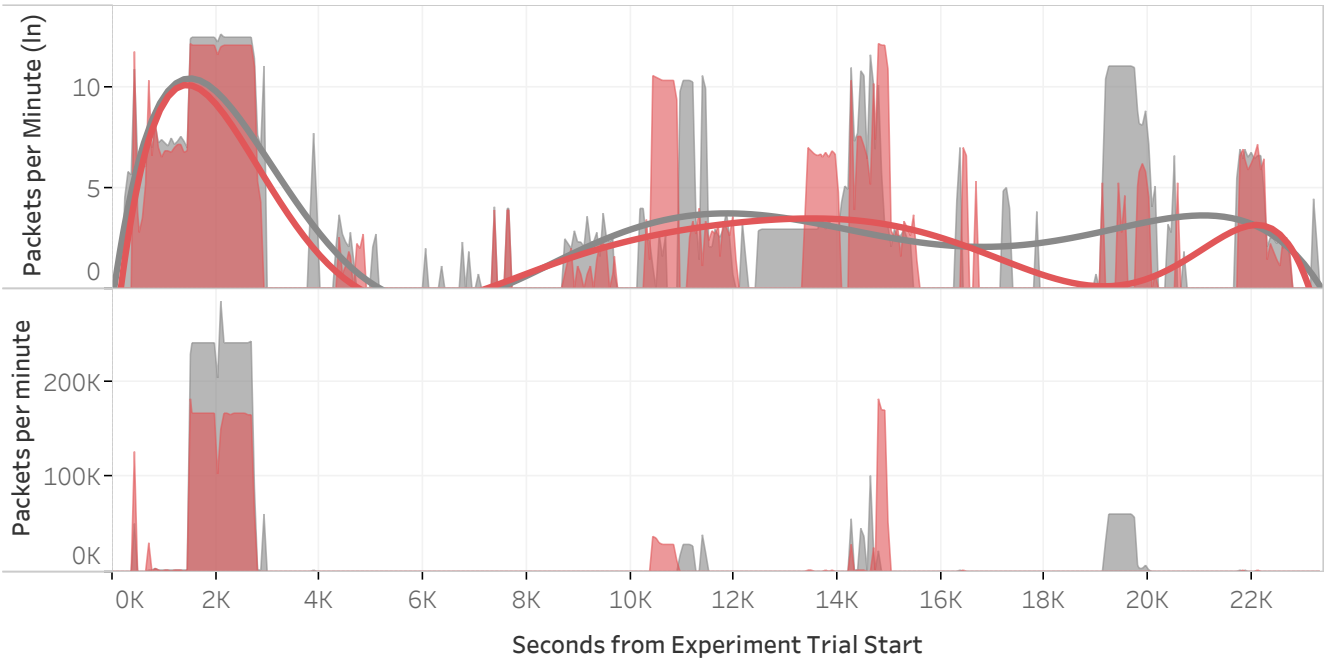



S88 - Day1 - PU - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
10
8
6
4
2
0
Overall Real to Decoy Ratio: 1.863
Real to Decoy Packet Ratio Time Average - 1.474
Running Sum of Packets
14M
12M
10M
8M
6M
4M
2M
0M
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

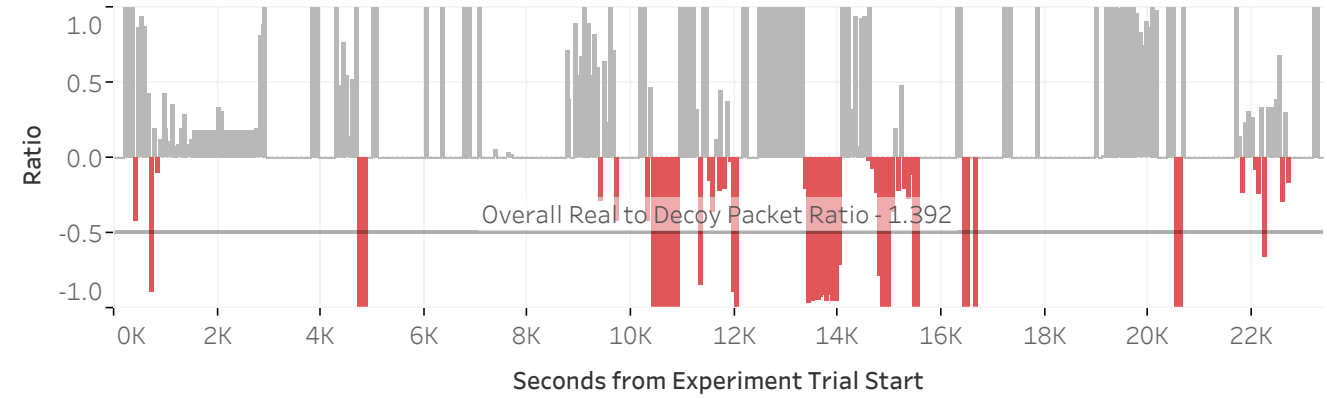
S89 - Day1 - PU

Legend
Real Systems
Decoy Systems

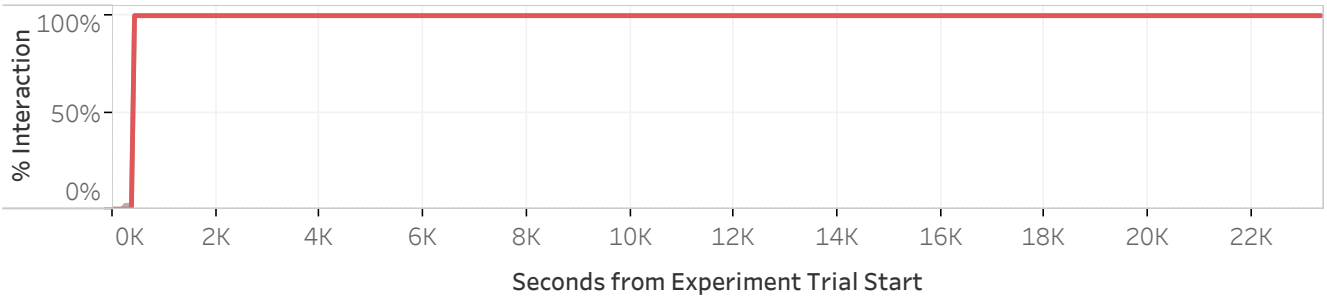
Real & Decoy Packets per Minute

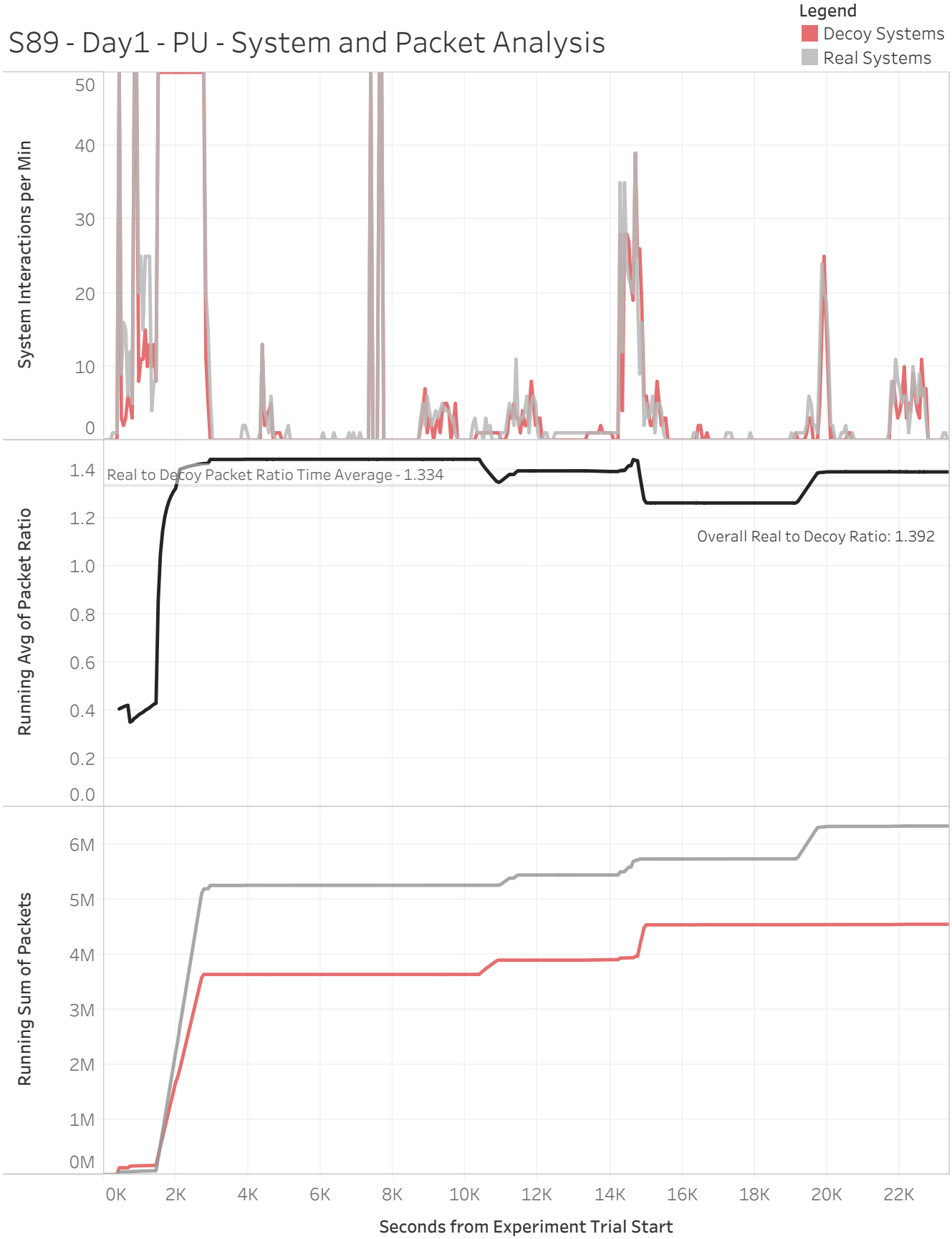


Real to Decoy Packet Ratio



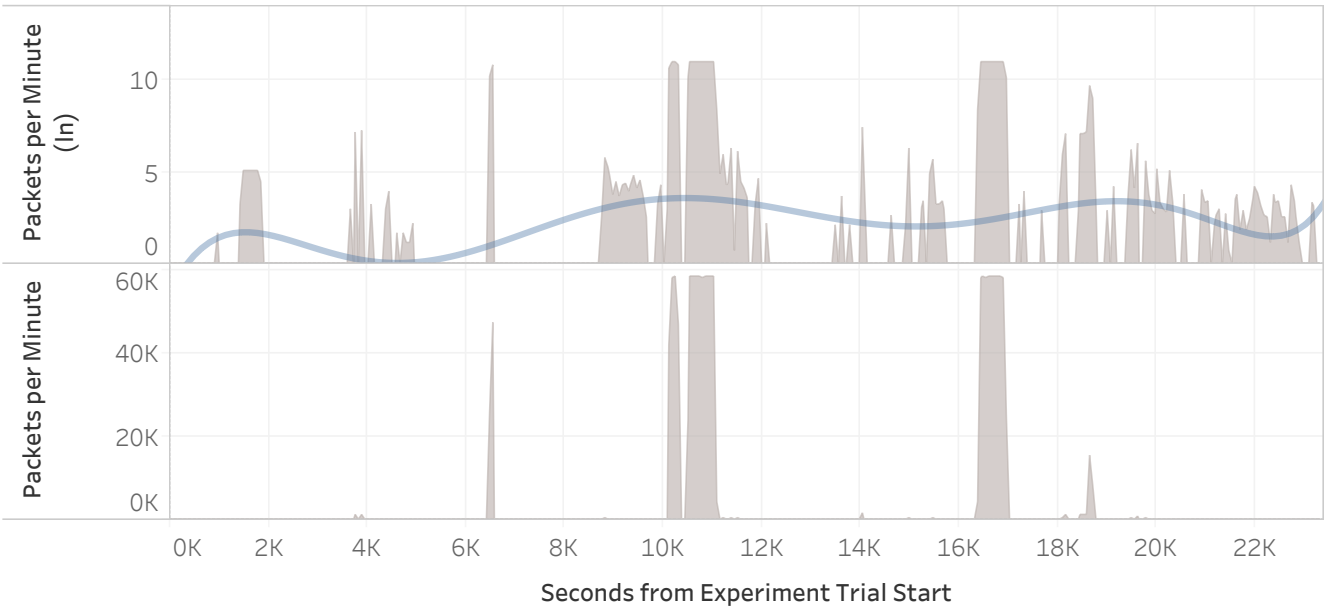
Real & Decoy System Interaction Timeline



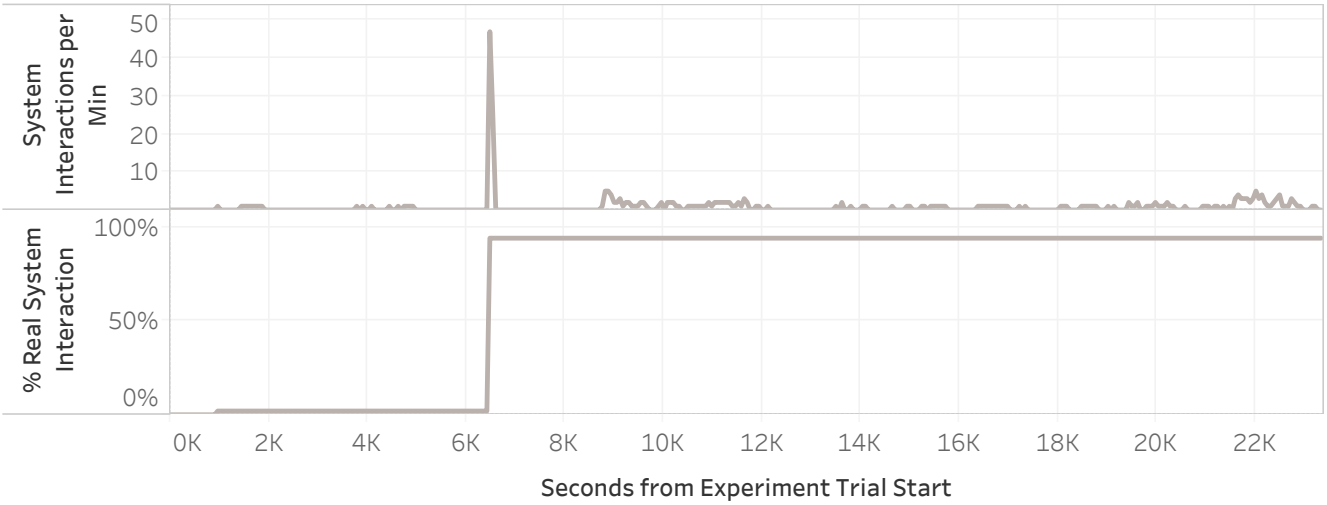

S89 - Day1 - PU - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
Real to Decoy Packet Ratio Time Average - 1.334
Overall Real to Decoy Ratio: 1.392
Running Sum of Packets
6M
5M
4M
3M
2M
1M
0M
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

S90 - Day 1 - AI

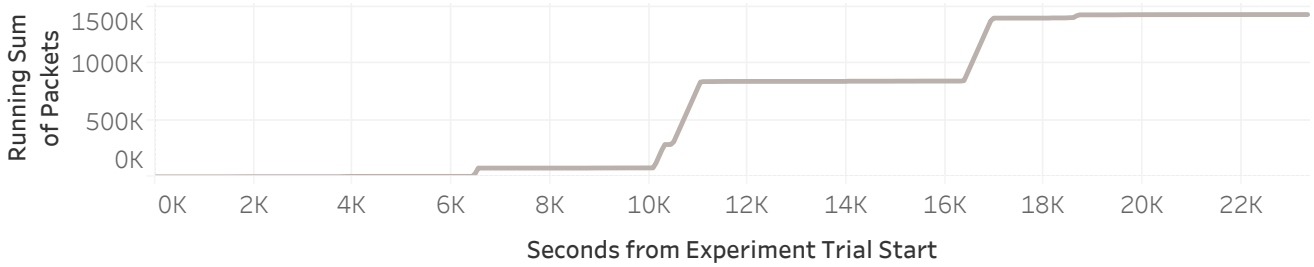
Real Packets per Minute



Real System Interaction Timeline



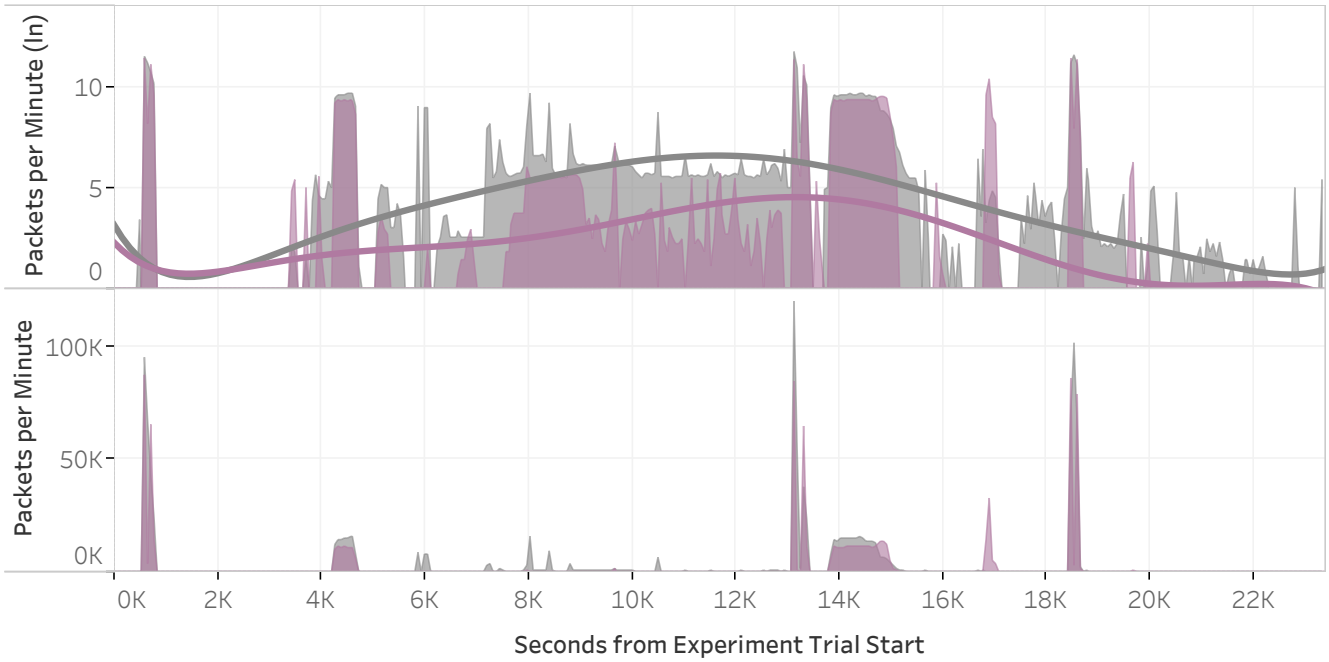
Running Sum of Packets



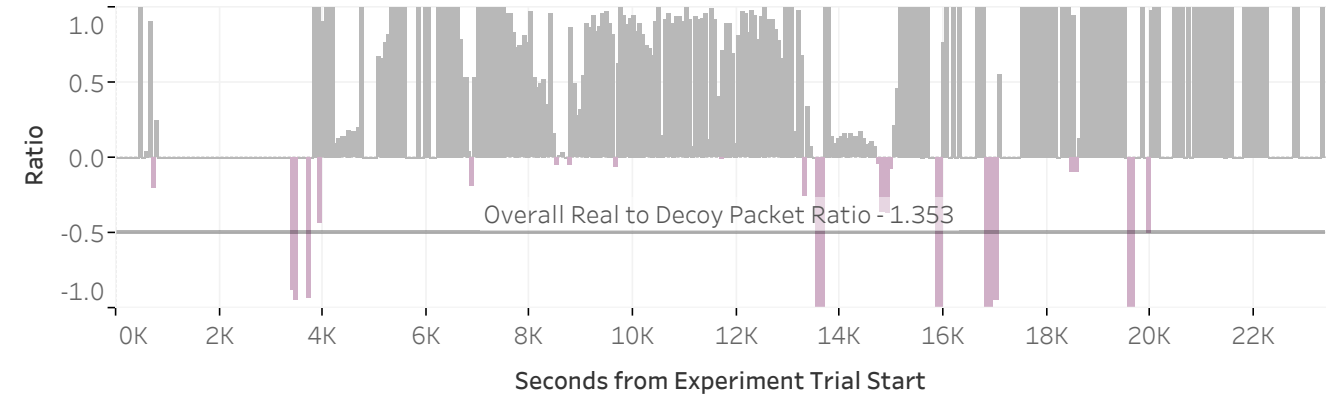
S91 - Day1 - PI

Legend
Real Systems
Decoy Systems

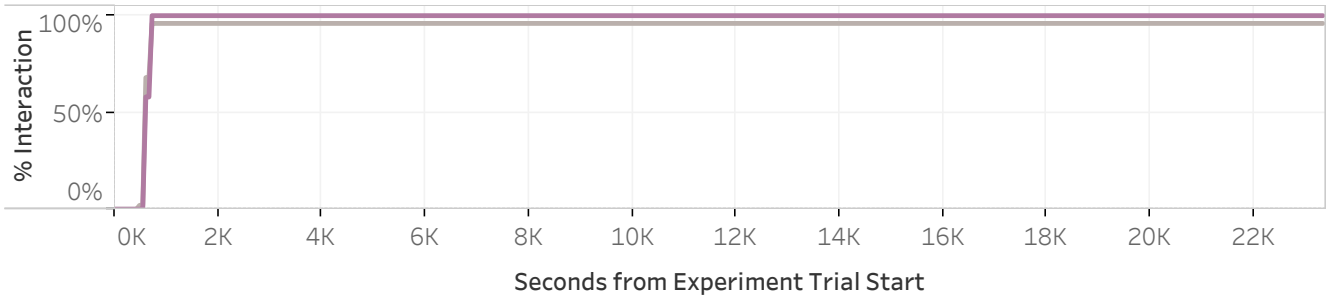
Real & Decoy Packets per Minute

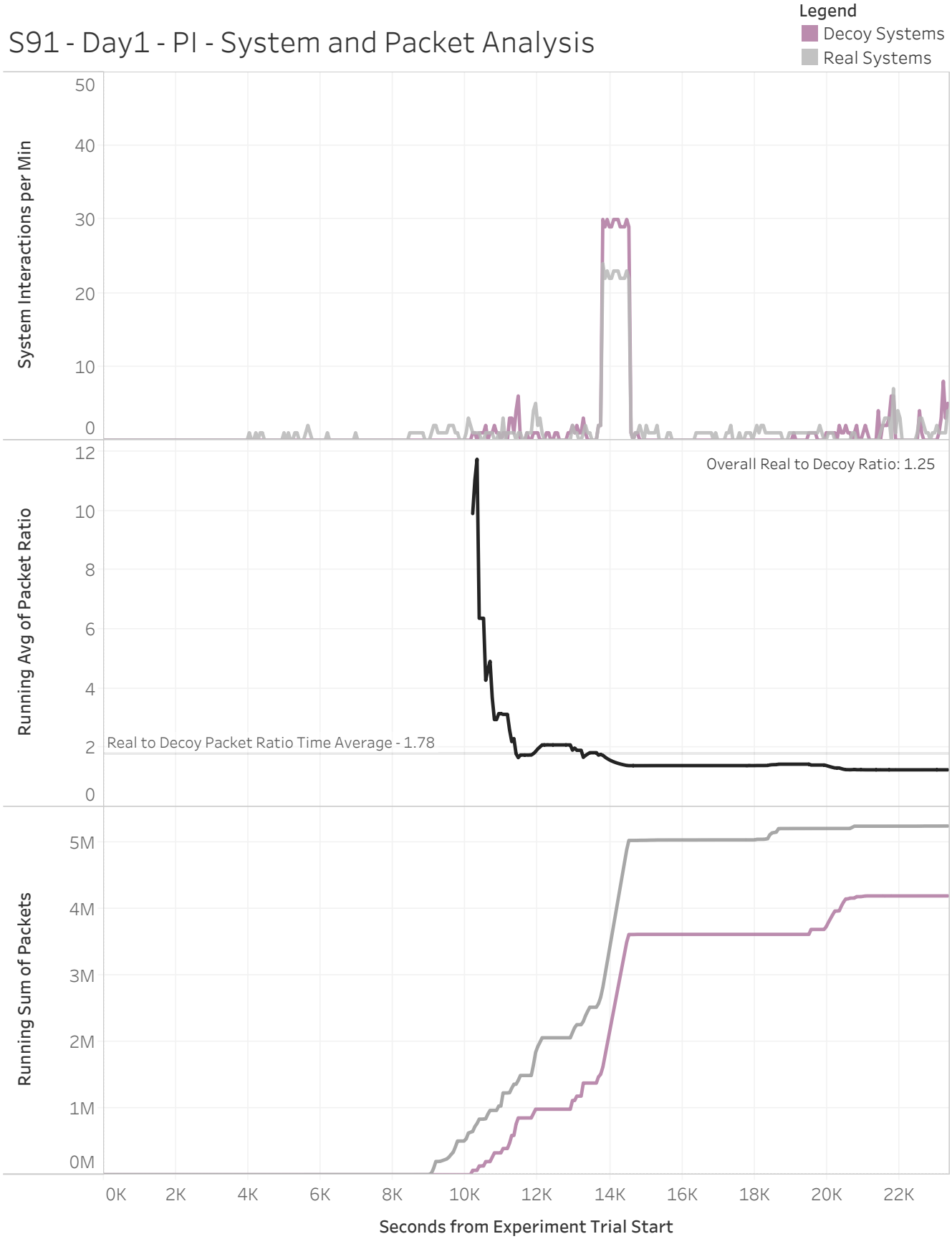


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

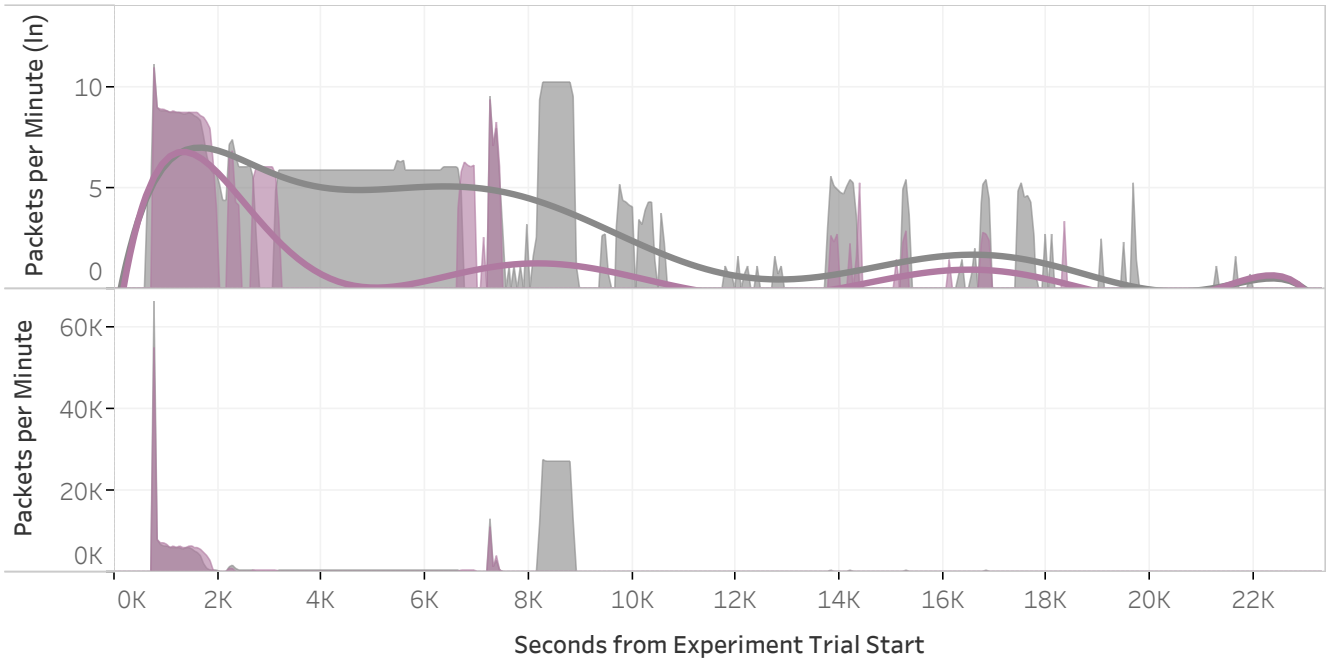



S91 - Day1 - PI - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
12
10
8
6
4
2
0
Overall Real to Decoy Ratio: 1.25
Real to Decoy Packet Ratio Time Average - 1.78
Running Sum of Packets
5M
4M
3M
2M
1M
0M
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

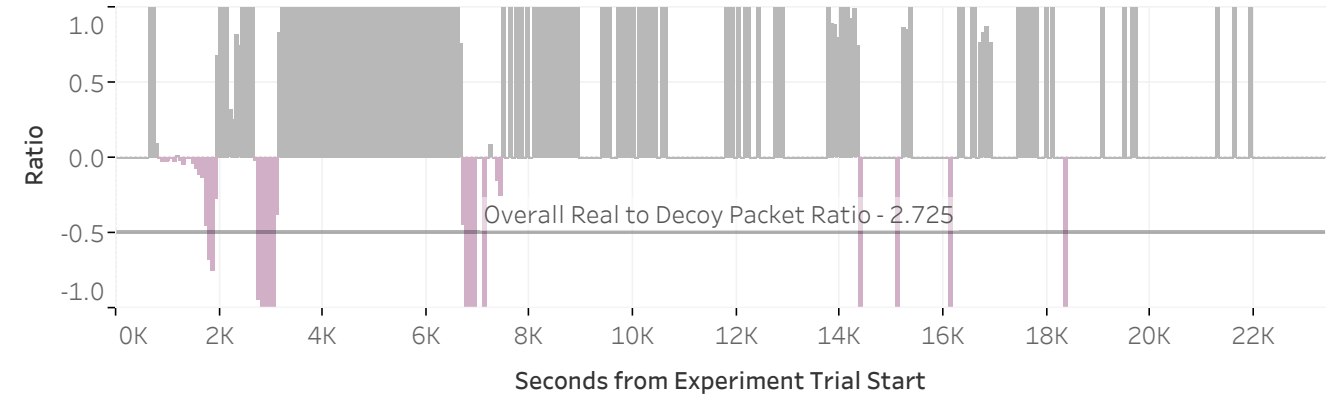
S92 - Day1 - PI

Legend
Real Systems
Decoy Systems

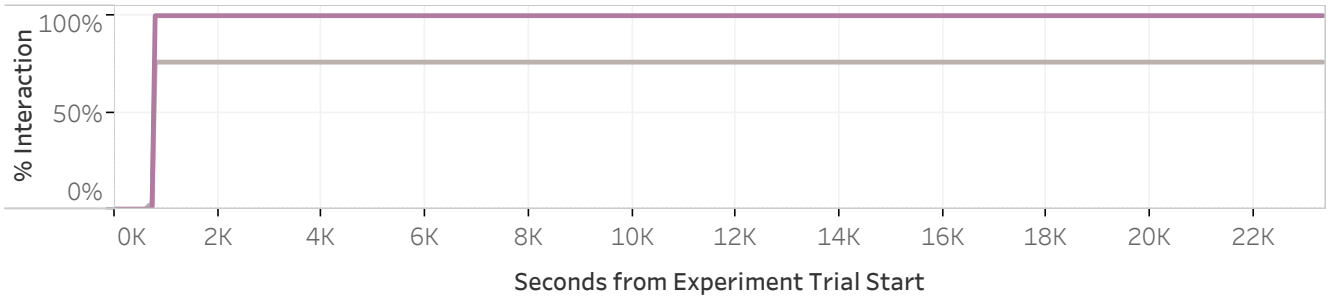
Real & Decoy Packets per Minute

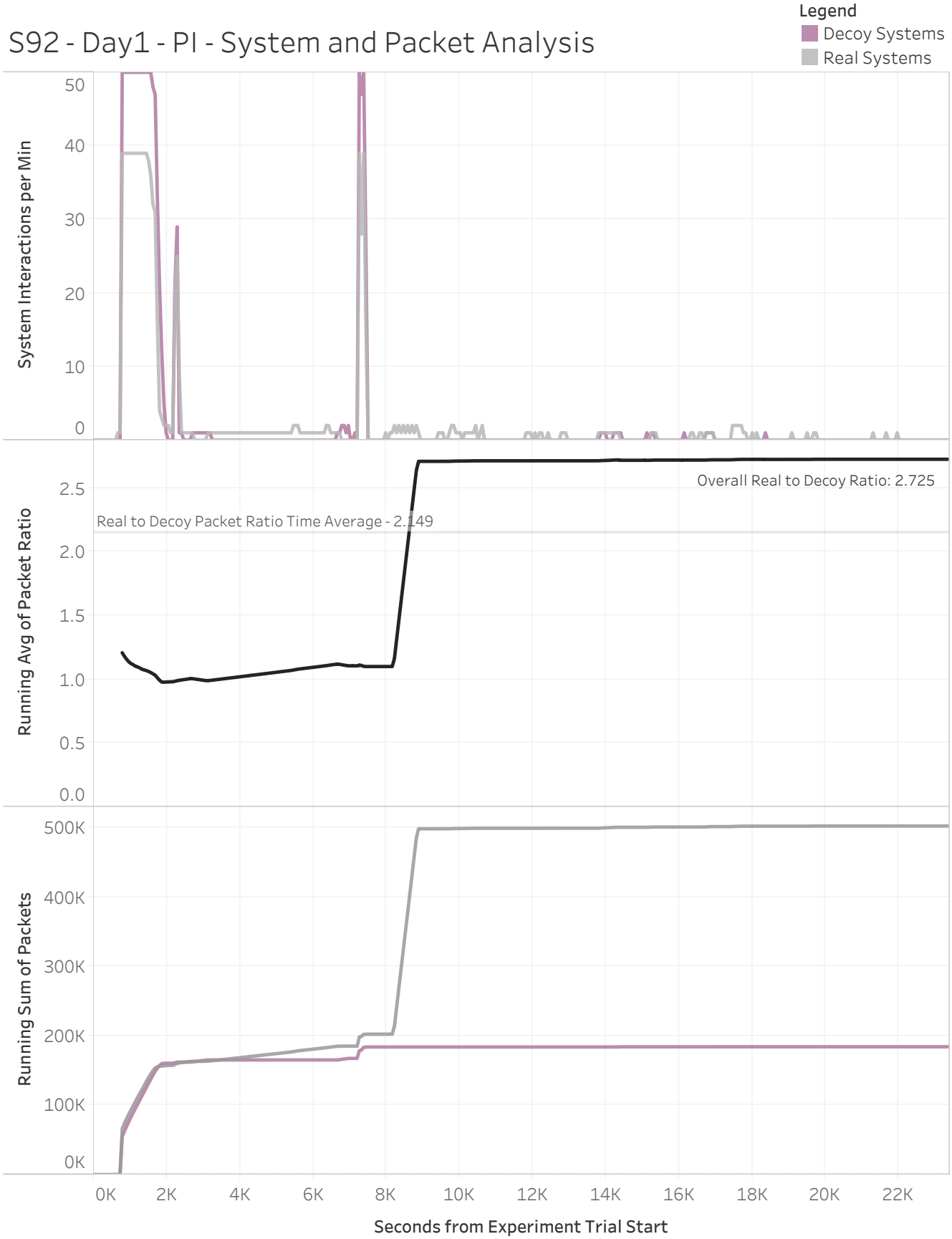


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

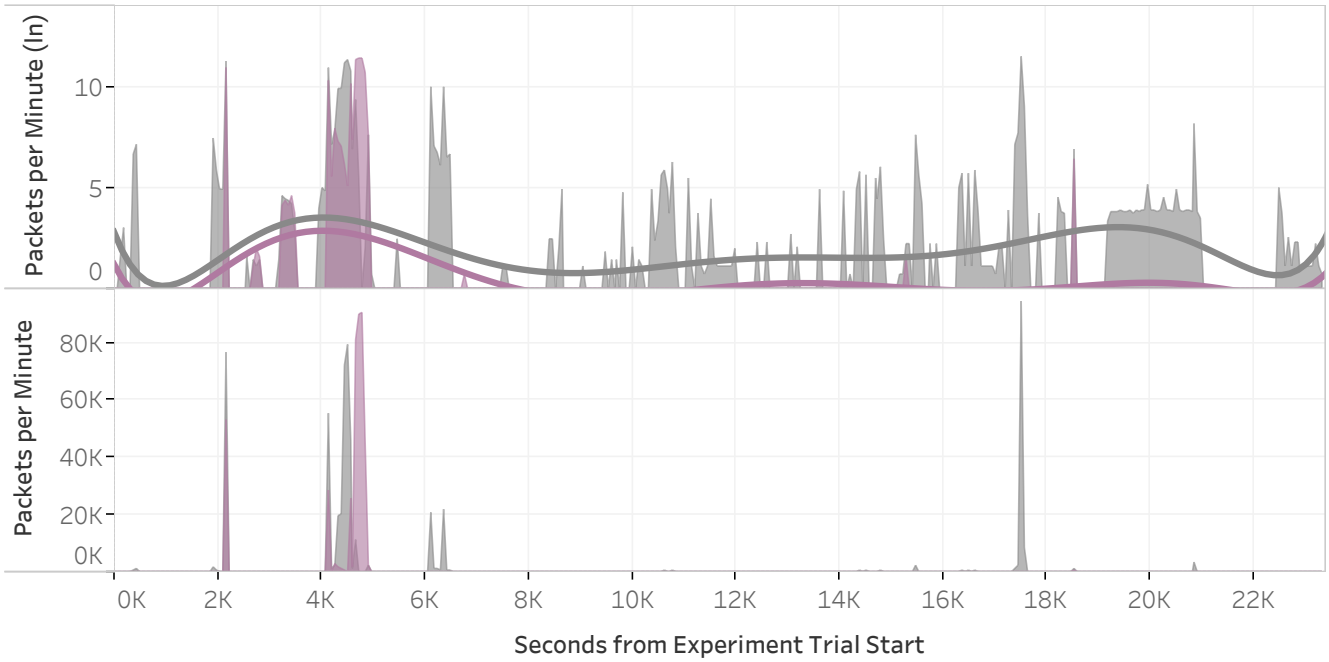



S92 - Day1 - PI - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
2.5
2.0
1.5
1.0
0.5
0.0
Real to Decoy Packet Ratio Time Average - 2.149
Overall Real to Decoy Ratio: 2.725
Running Sum of Packets
500K
400K
300K
200K
100K
0K
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

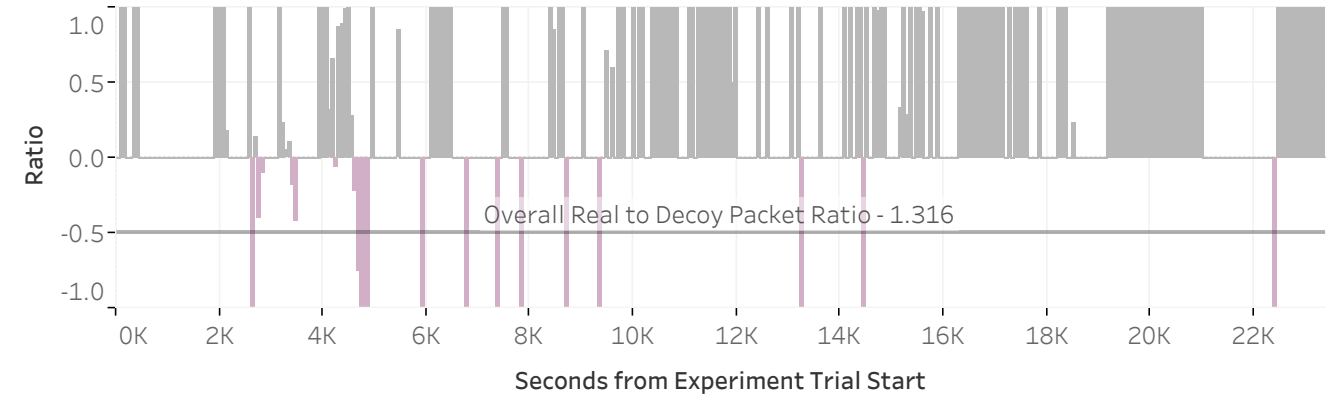
S93 - Day1 - PI

Legend
Real Systems
Decoy Systems

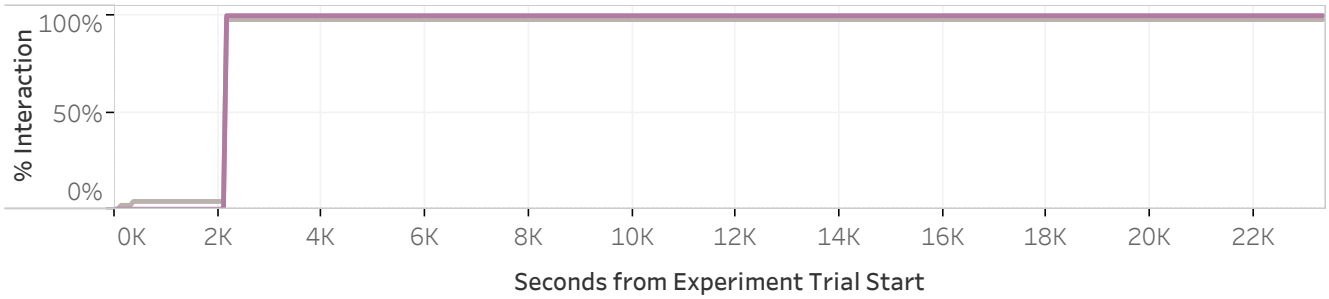
Real & Decoy Packets per Minute

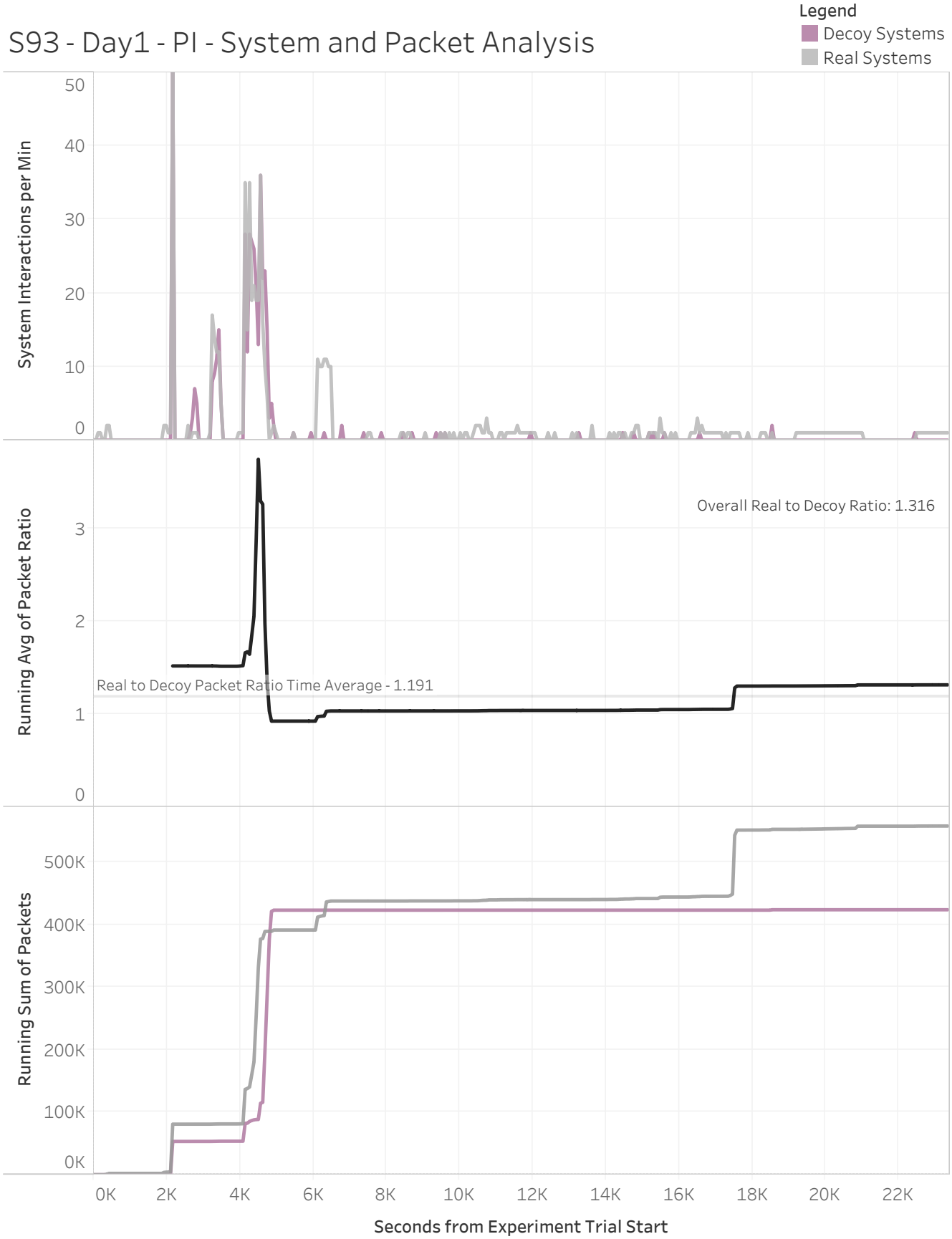


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

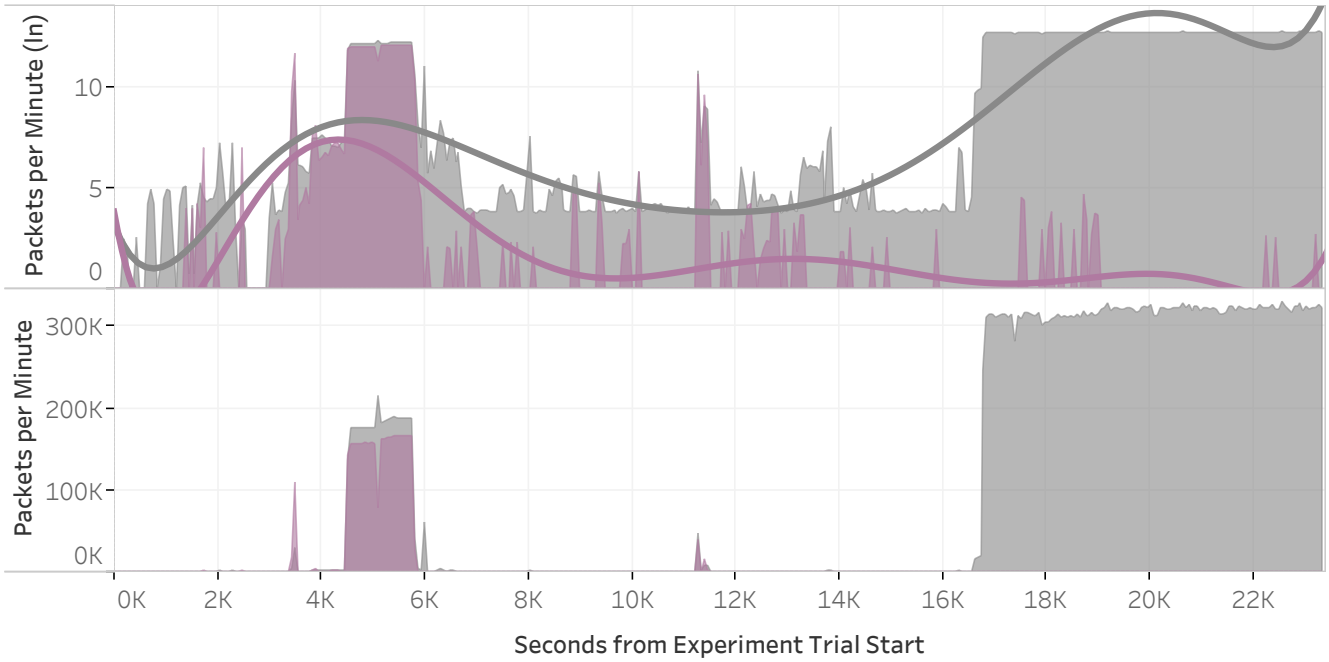



S93 - Day1 - PI - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
3
2
1
0
Overall Real to Decoy Ratio: 1.316
Real to Decoy Packet Ratio Time Average - 1.191
Running Sum of Packets
500K
400K
300K
200K
100K
0K
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

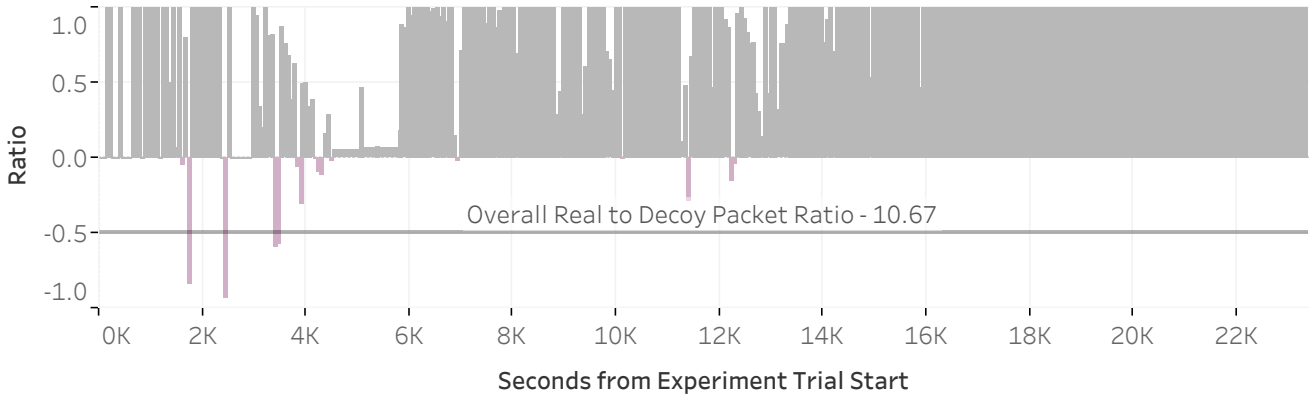
S94 - Day1 - PI

Legend
Real Systems
Decoy Systems

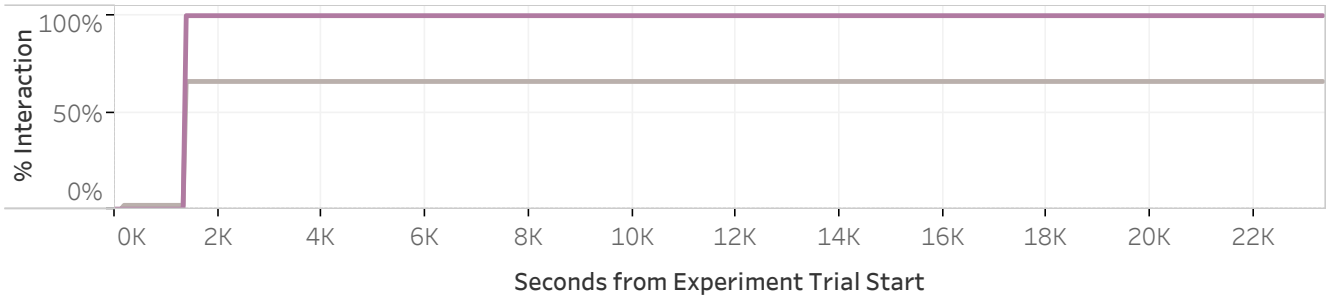
Real & Decoy Packets per Minute

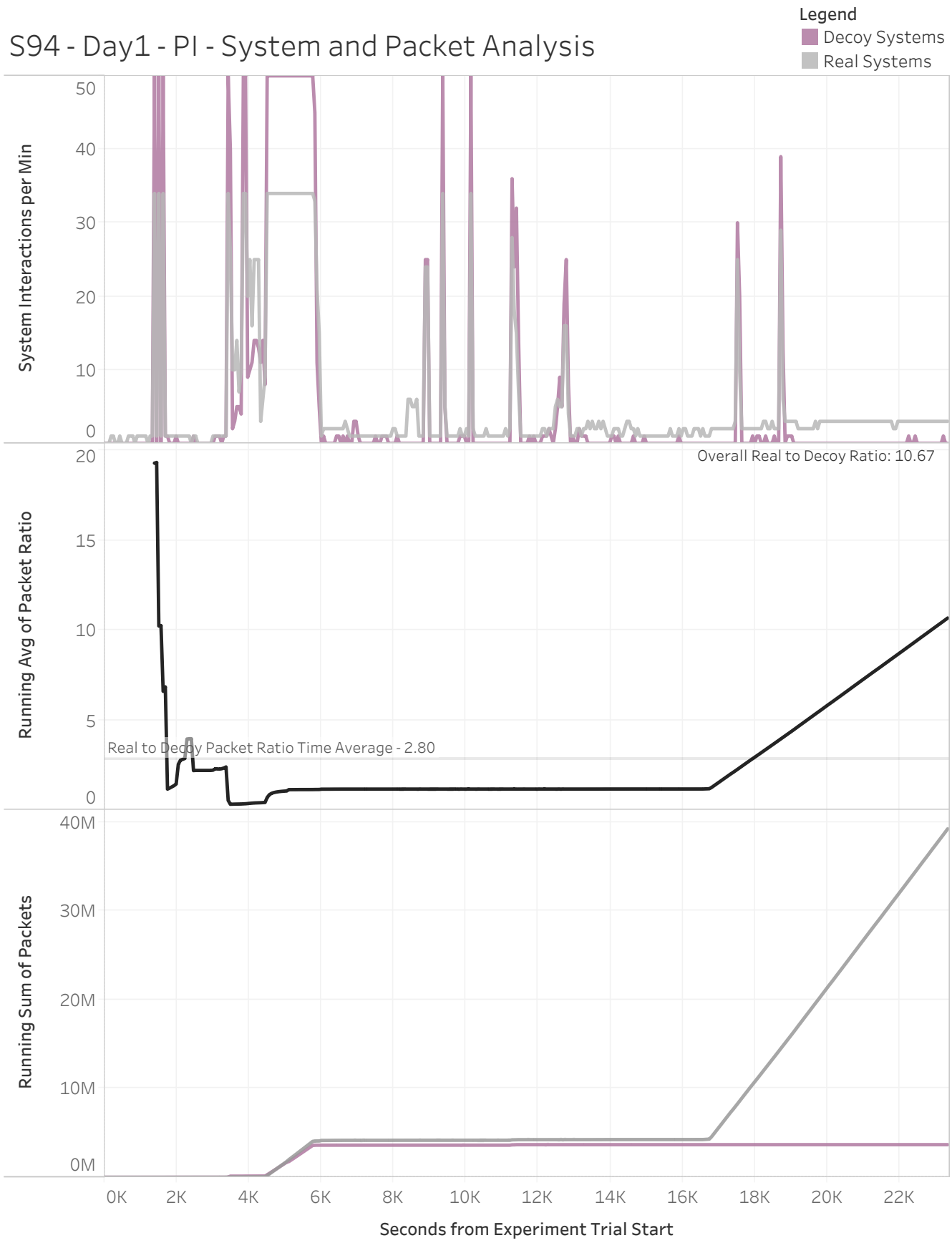


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

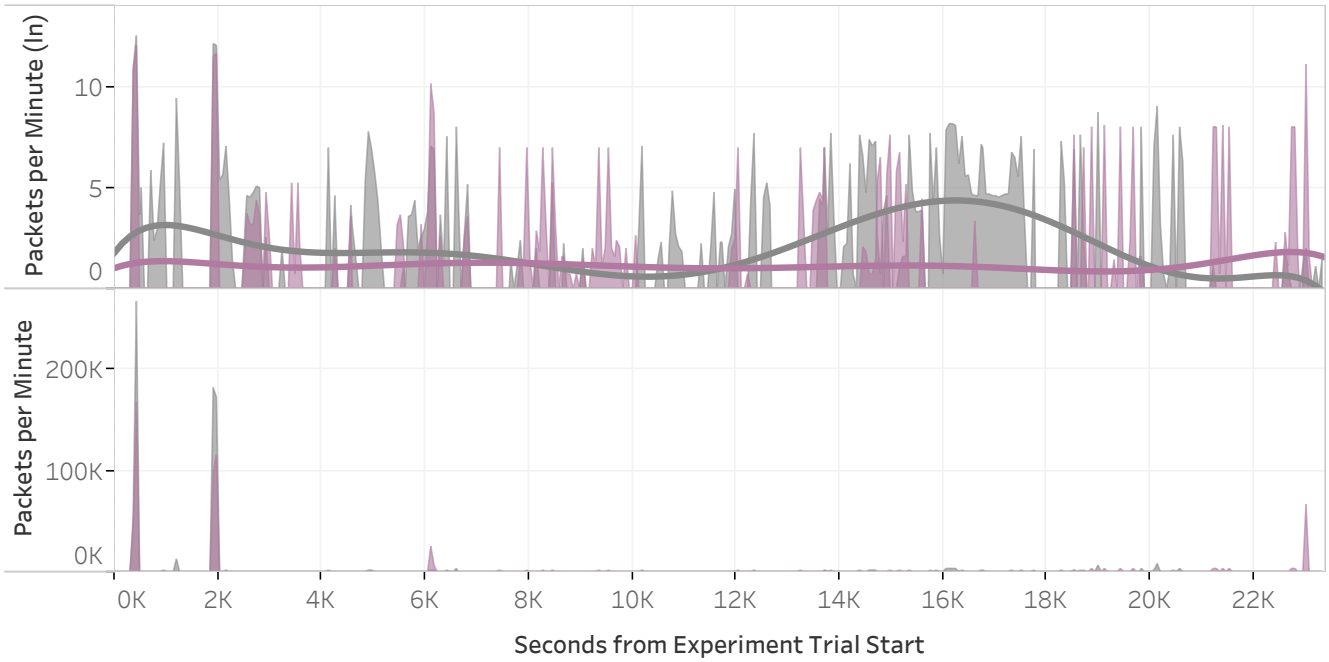



S94 - Day1 - PI - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
20
15
10
5
0
Overall Real to Decoy Ratio: 10.67
Real to Decoy Packet Ratio Time Average - 2.80
Running Sum of Packets
40M
30M
20M
10M
0M
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

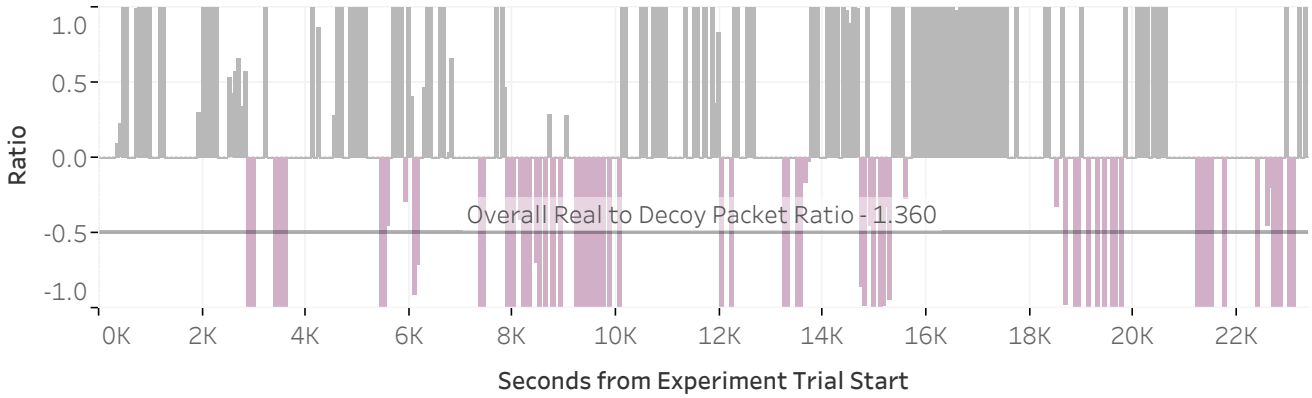
S95 - Day1 - PI

Legend
Real Systems
Decoy Systems

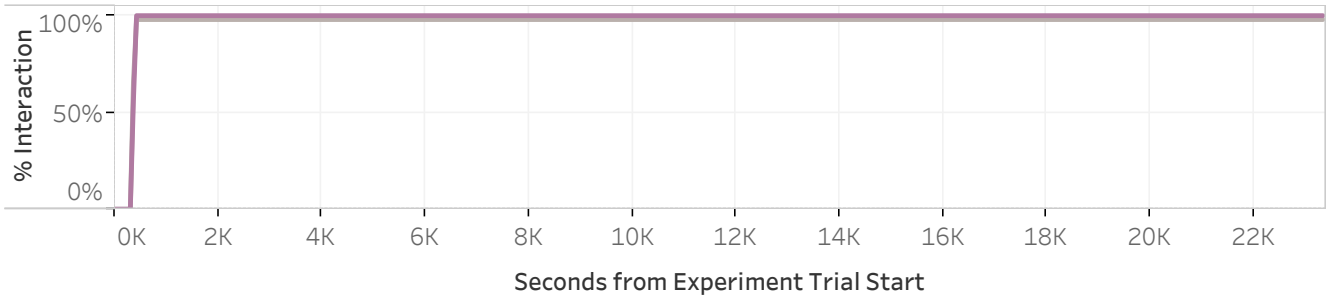
Real & Decoy Packets per Minute

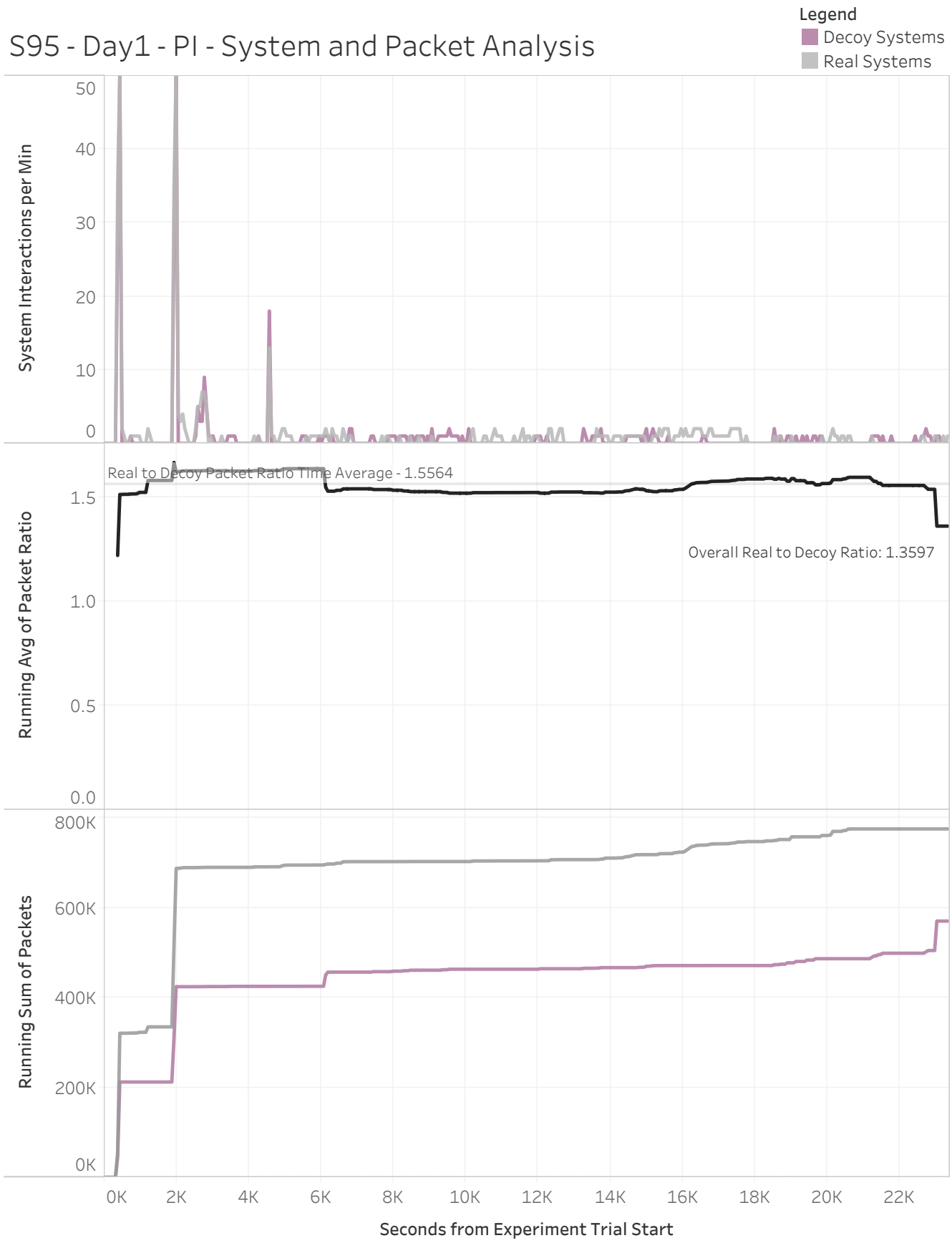


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

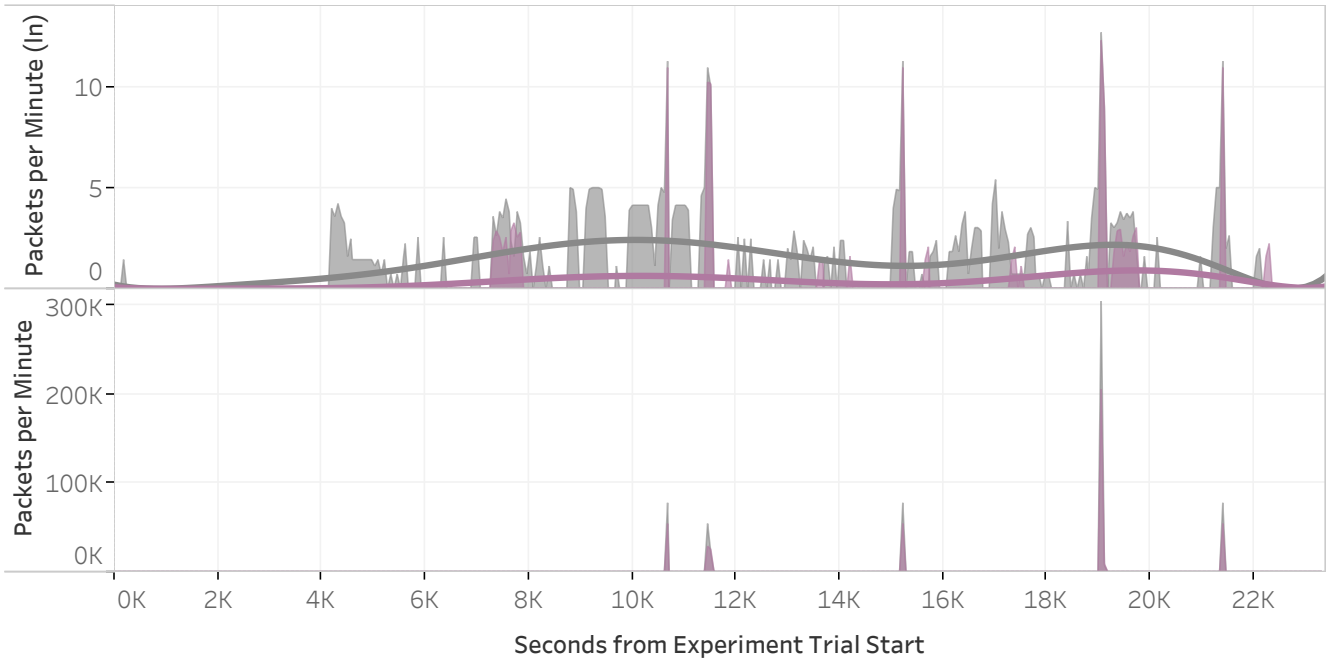



S95 - Day1 - PI - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Real to Decoy Packet Ratio Time Average - 1.5564
Overall Real to Decoy Ratio: 1.3597
Running Avg of Packet Ratio
1.5
1.0
0.5
0.0
Running Sum of Packets
800K
600K
400K
200K
0K
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

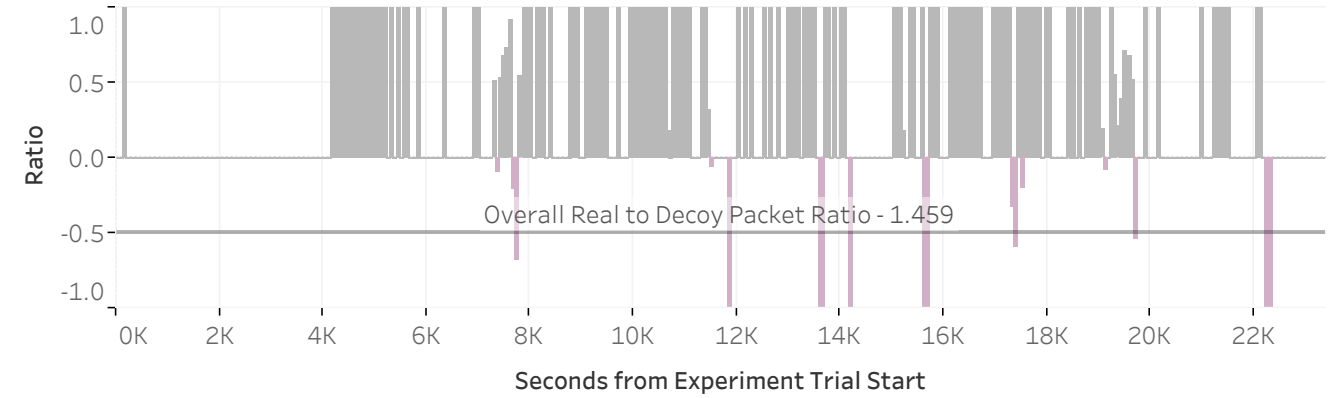
S96 - Day1 - PI

Legend
Real Systems
Decoy Systems

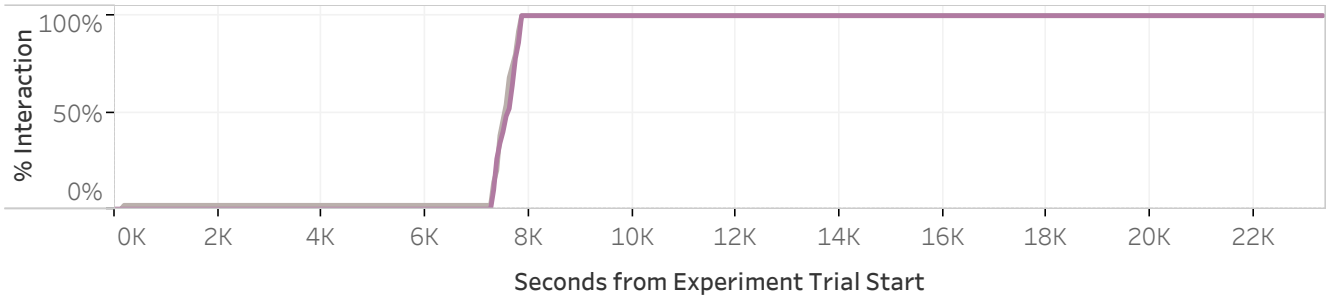
Real & Decoy Packets per Minute

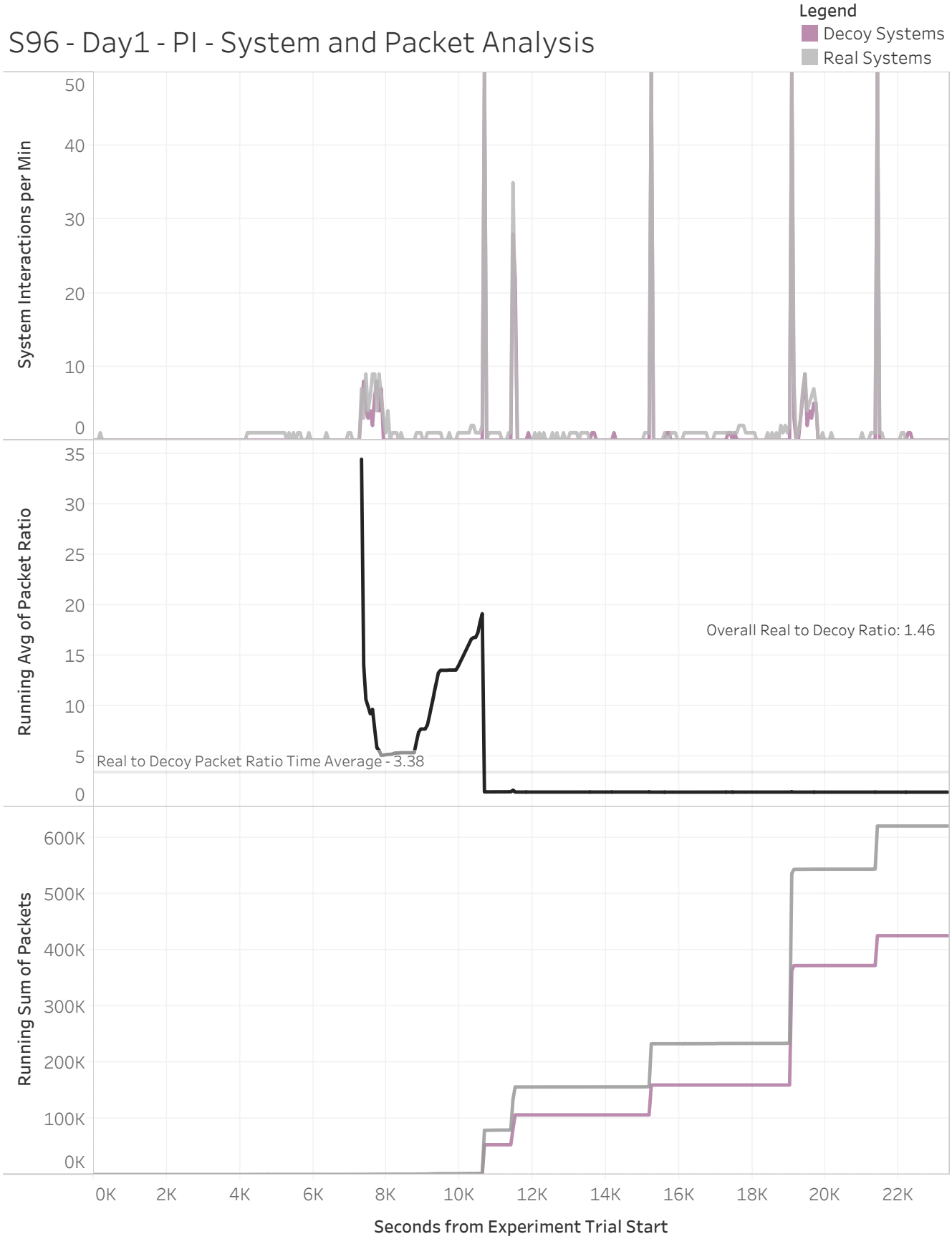


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

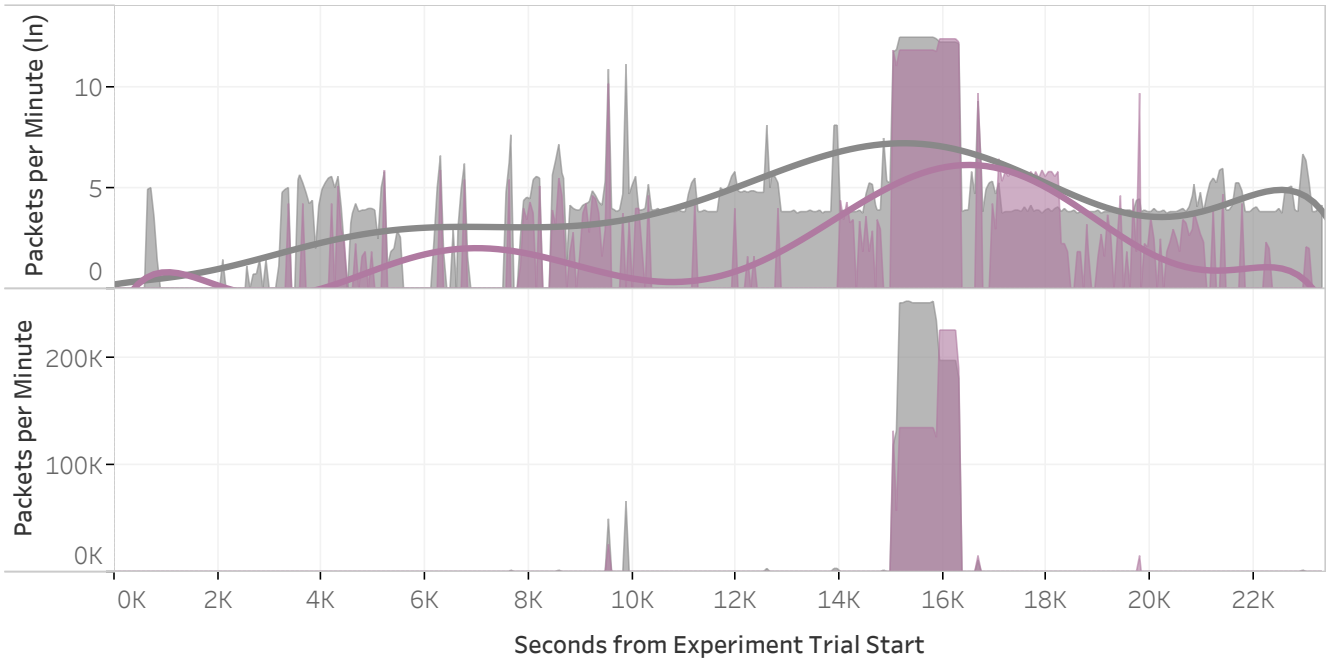



S96 - Day1 - PI - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
35
30
25
20
15
10
5
0
Overall Real to Decoy Ratio: 1.46
Real to Decoy Packet Ratio Time Average - 3.38
Running Sum of Packets
600K
500K
400K
300K
200K
100K
0K
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

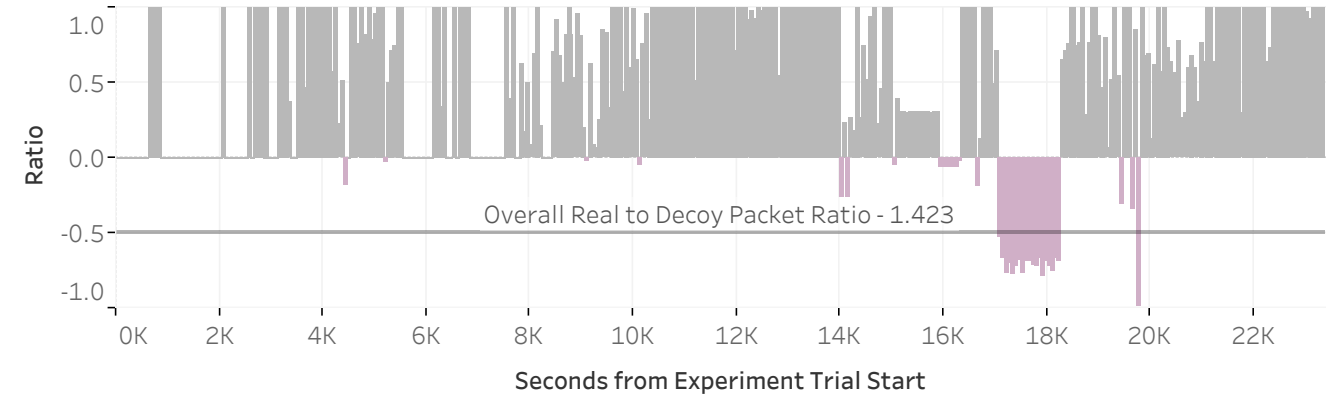
S97 - Day1 - PI

Legend
Real Systems
Decoy Systems

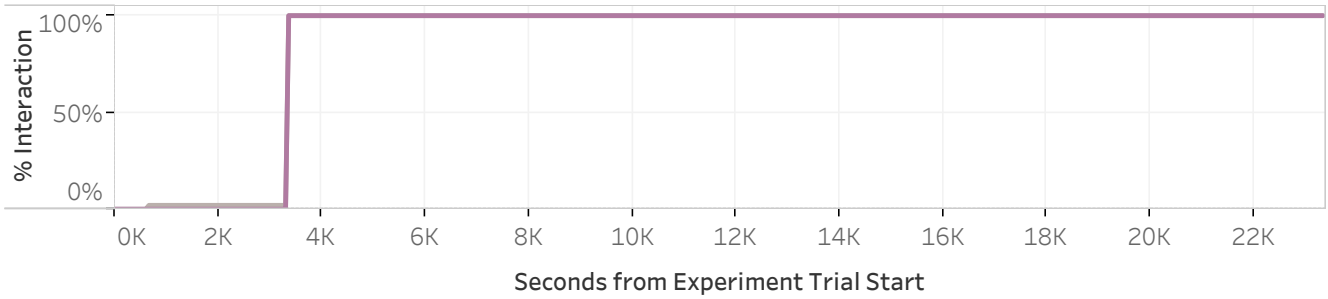
Real & Decoy Packets per Minute

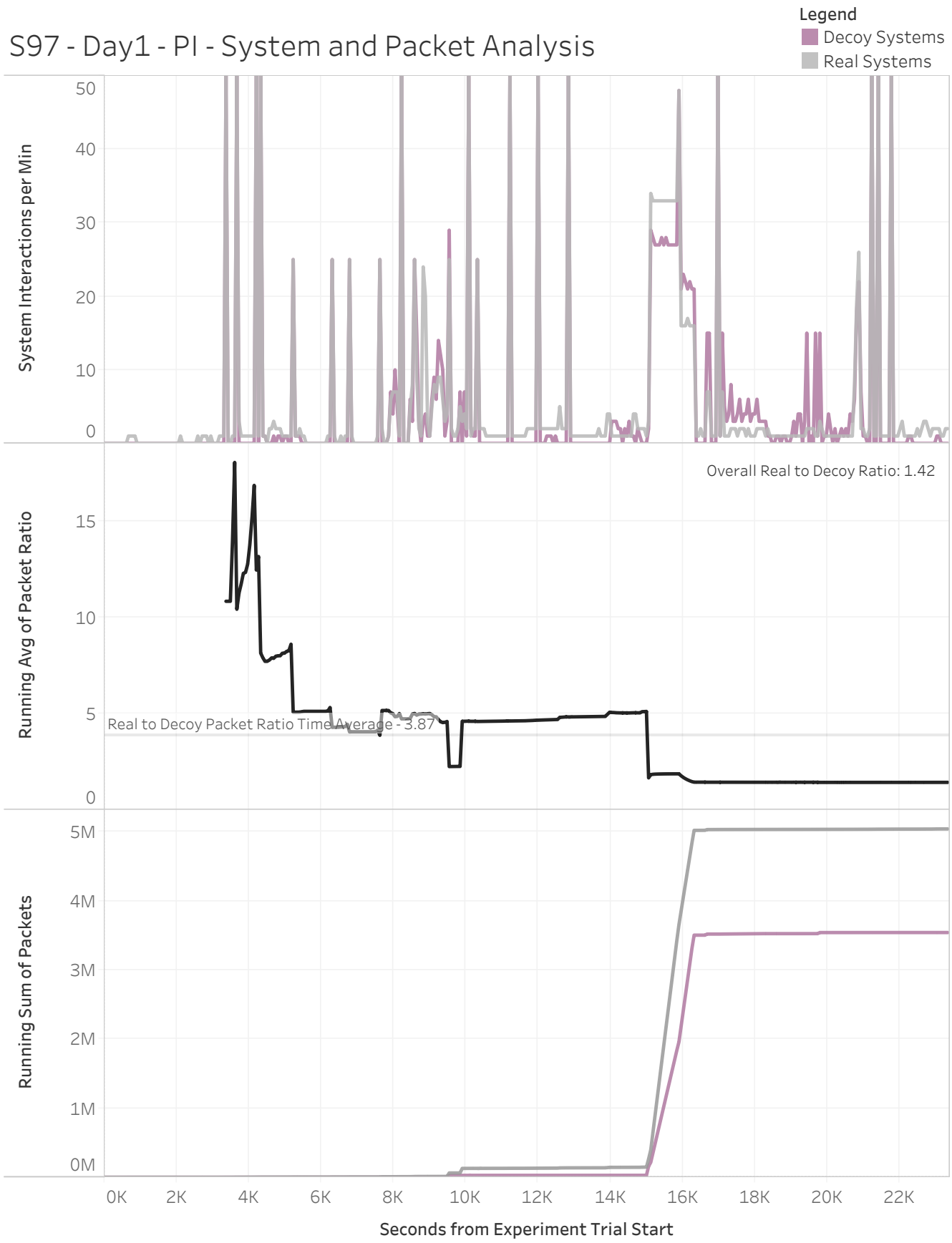


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

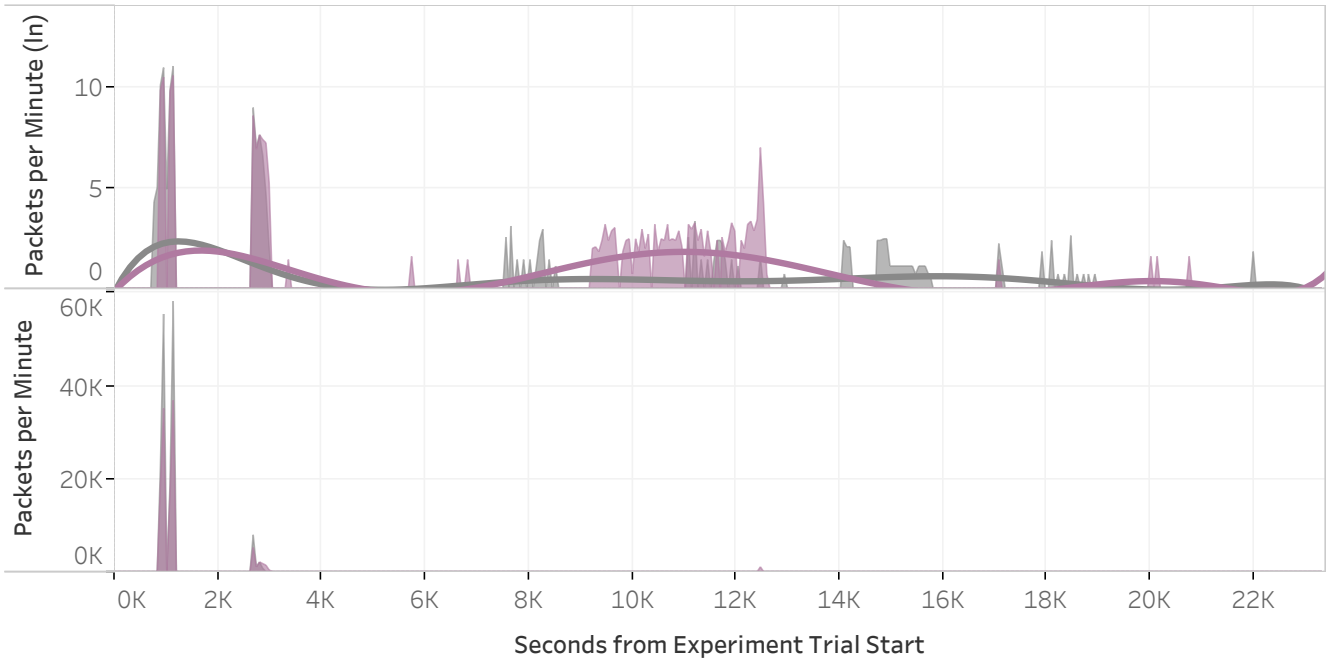



S97 - Day1 - PI - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
15
10
5
0
Overall Real to Decoy Ratio: 1.42
Real to Decoy Packet Ratio Time Average - 3.87
Running Sum of Packets
5M
4M
3M
2M
1M
0M
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

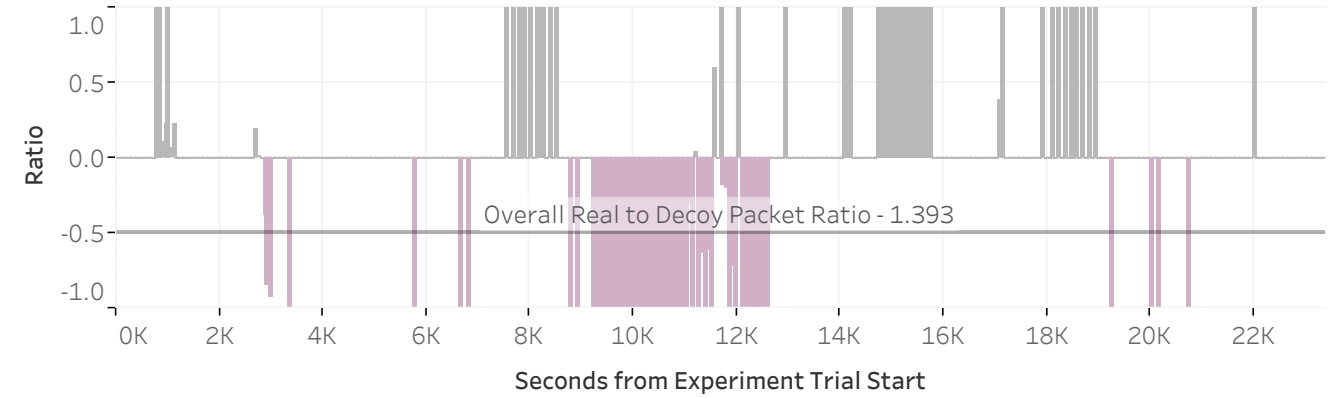
S98 - Day1 - PI

Legend
Real Systems
Decoy Systems

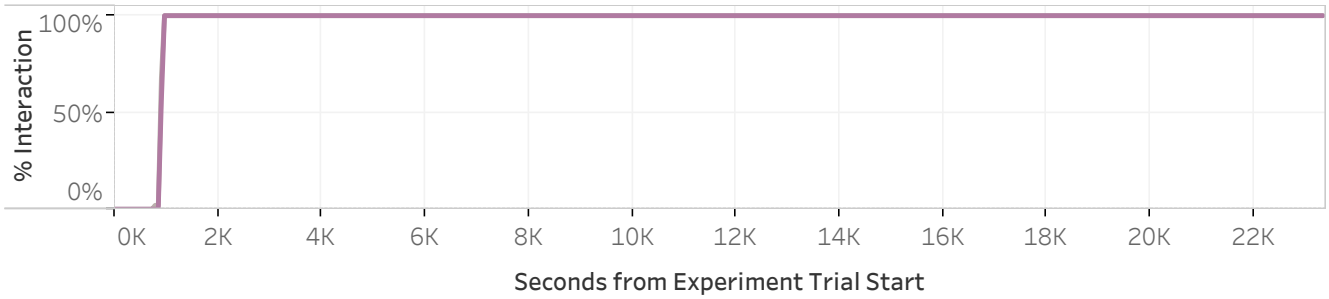
Real & Decoy Packets per Minute

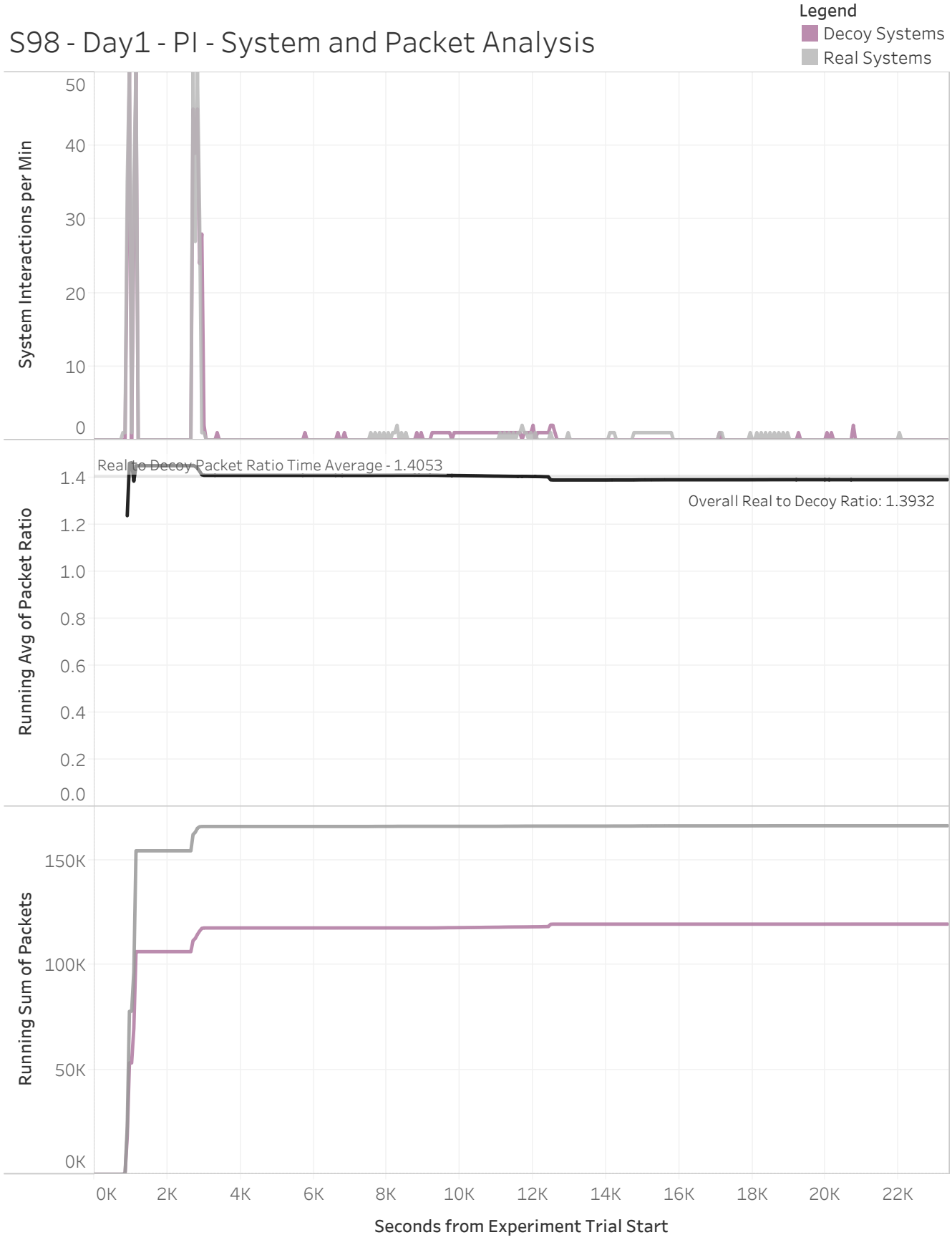


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

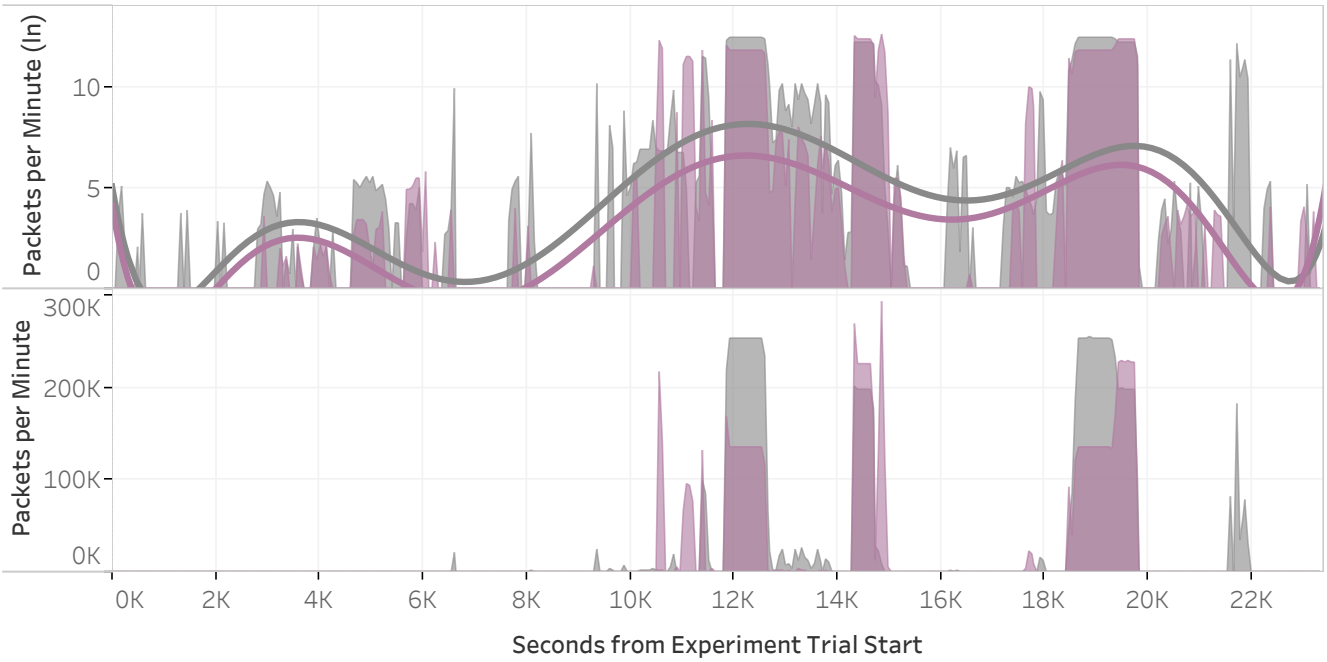



S98 - Day1 - PI - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Real to Decoy Packet Ratio Time Average - 1.4053
Overall Real to Decoy Ratio: 1.3932
Running Avg of Packet Ratio
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
Running Sum of Packets
150K
100K
50K
0K
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

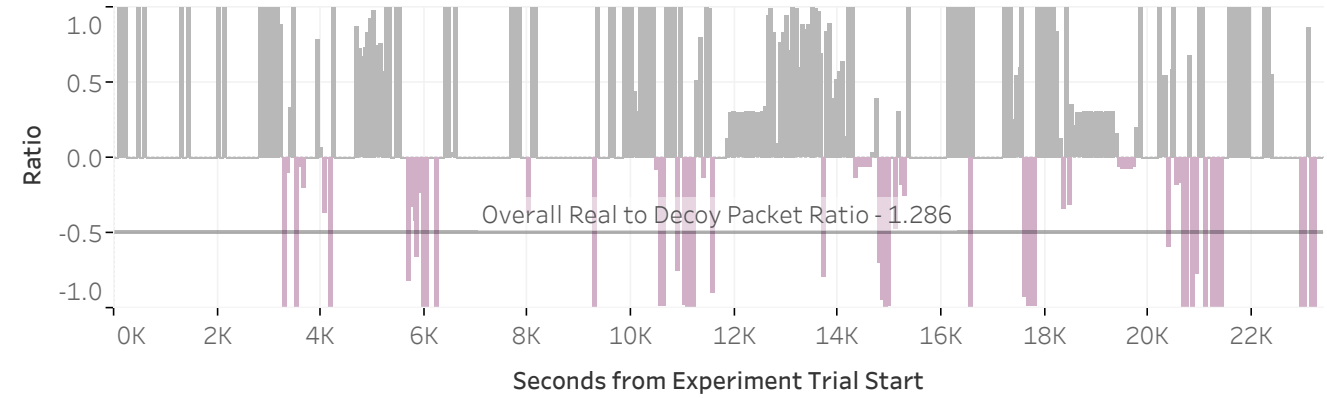
S99 - Day1 - PI

Legend
Real Systems
Decoy Systems

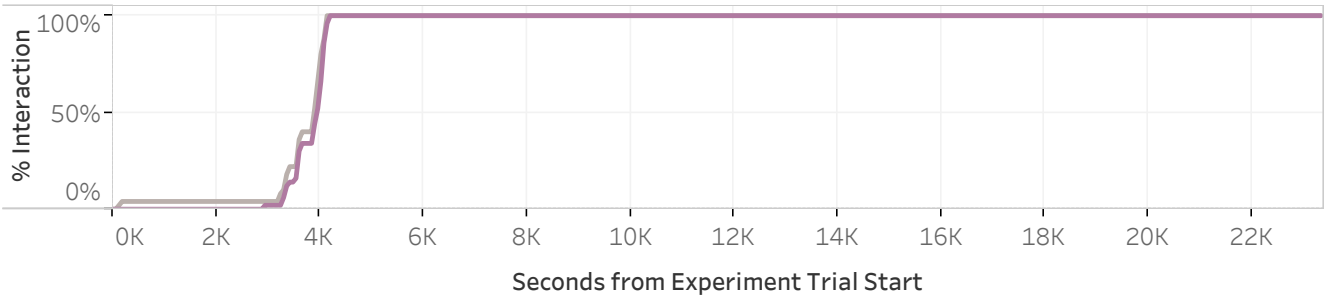
Real & Decoy Packets per Minute

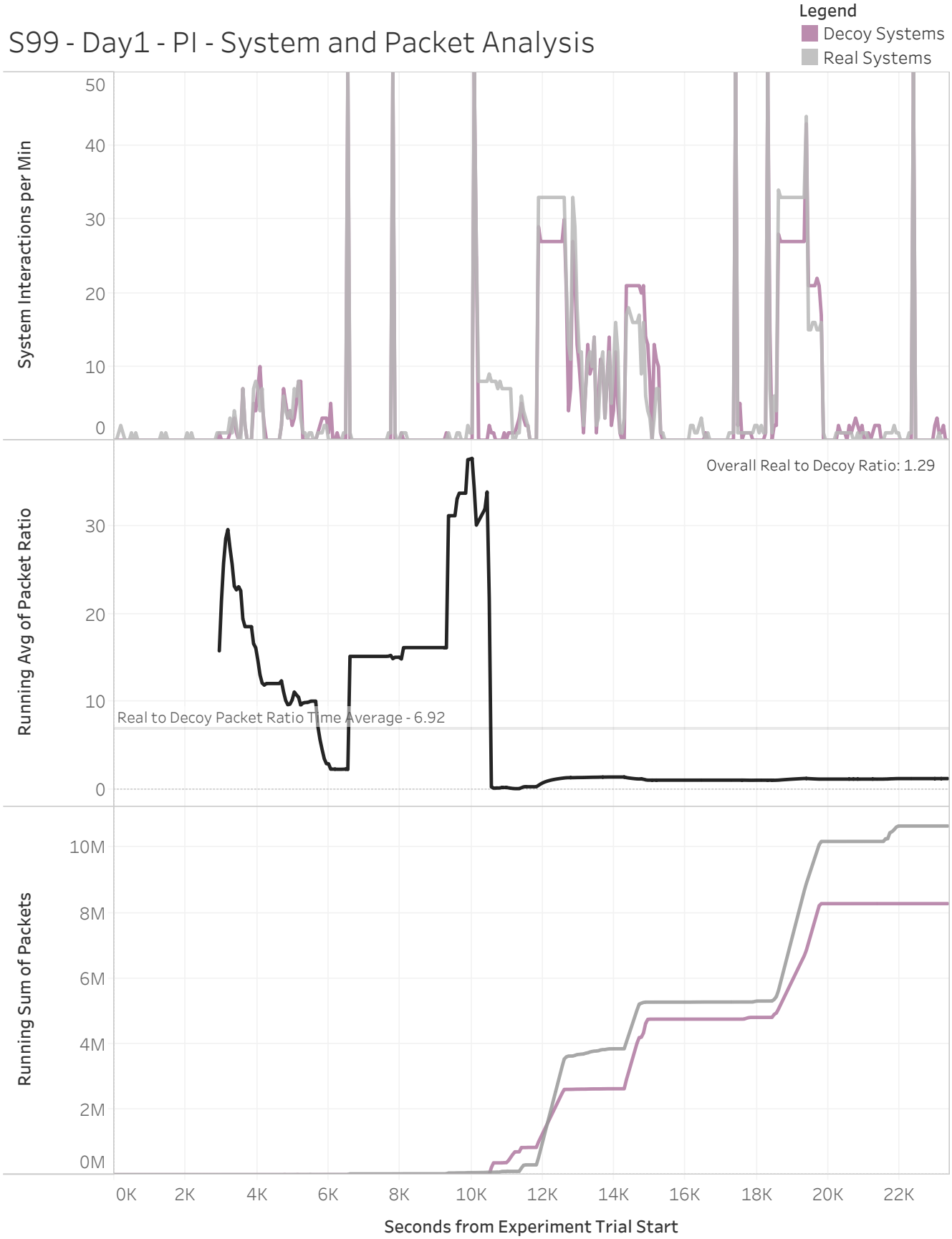


Real to Decoy Packet Ratio



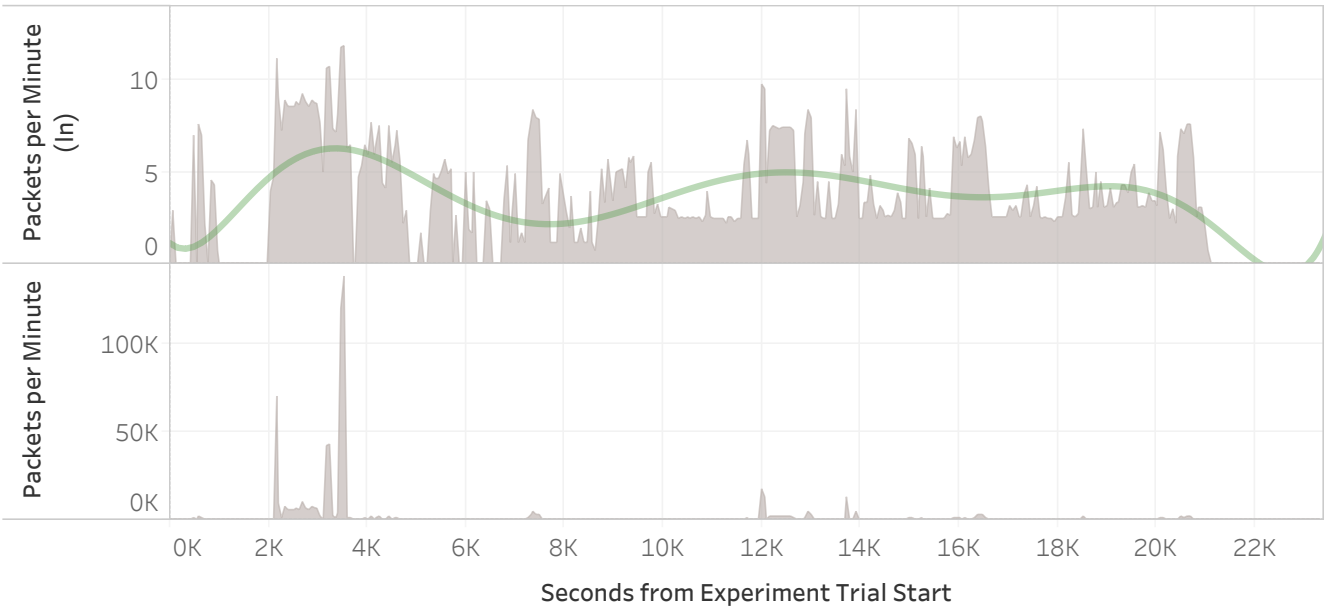
Real & Decoy System Interaction Timeline



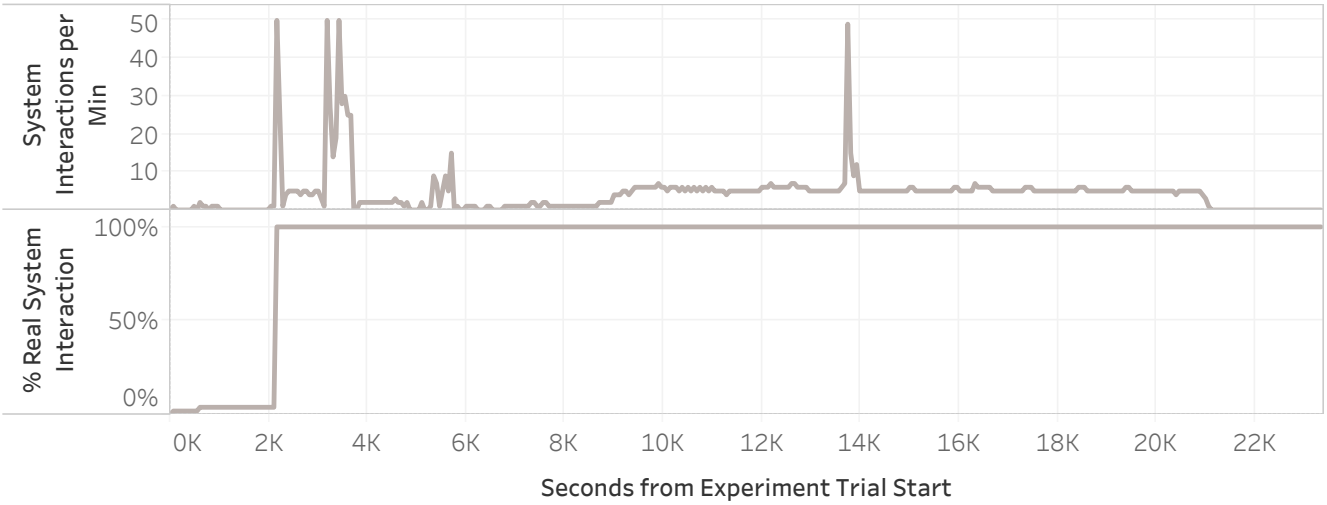

S99 - Day1 - PI - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
Overall Real to Decoy Ratio: 1.29
30
20
10
0
Real to Decoy Packet Ratio Time Average - 6.92
Running Sum of Packets
10M
8M
6M
4M
2M
0M
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

S100 - Day 1 - AU

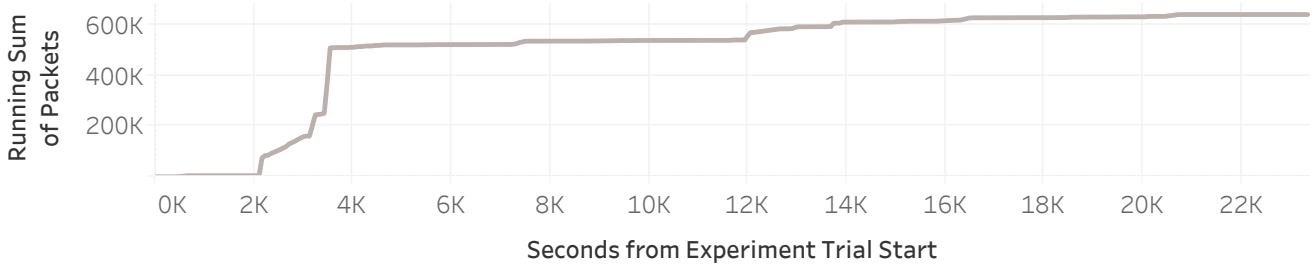
Real Packets per Minute



Real System Interaction Timeline

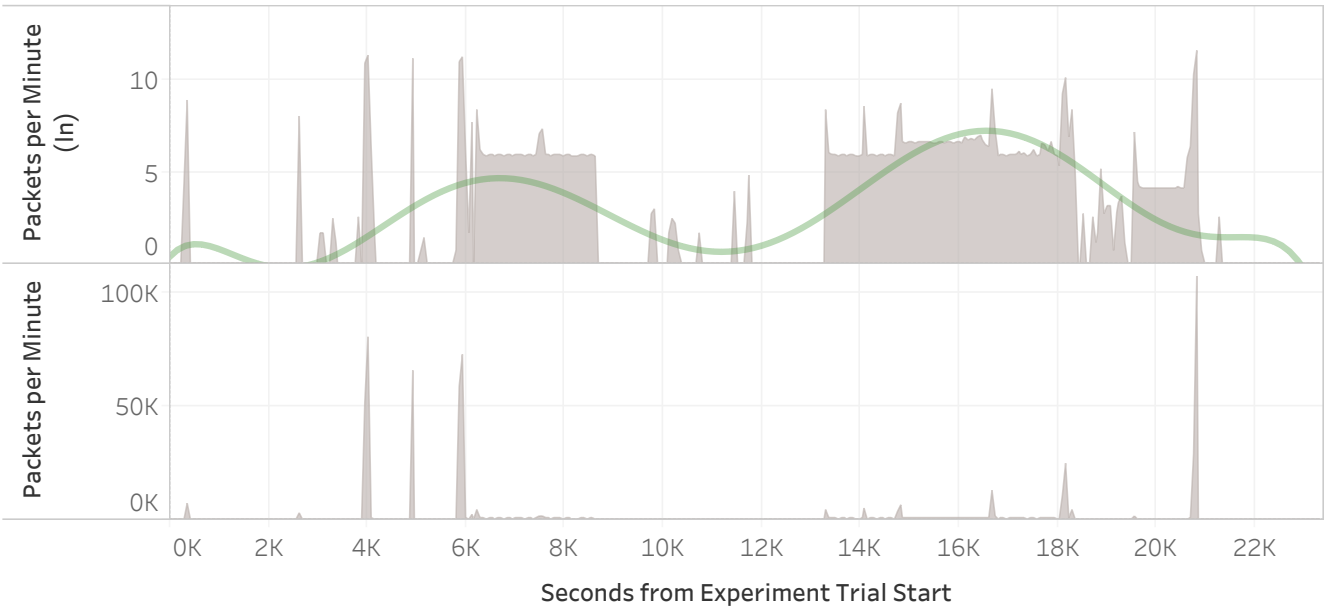


Running Sum of Packets

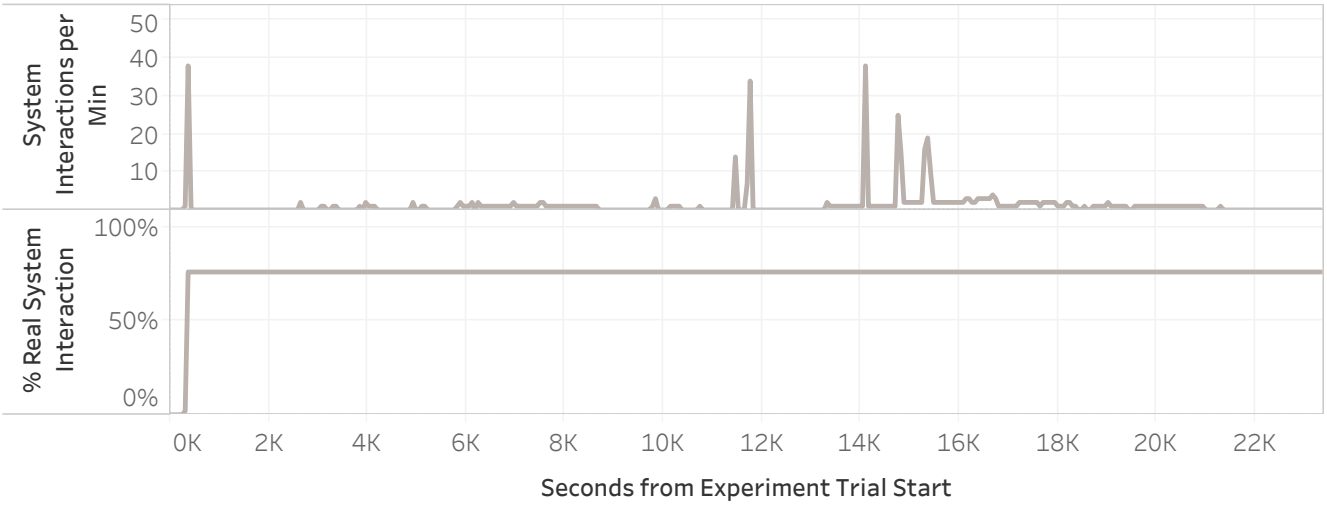


S101 - Day 1 - AU

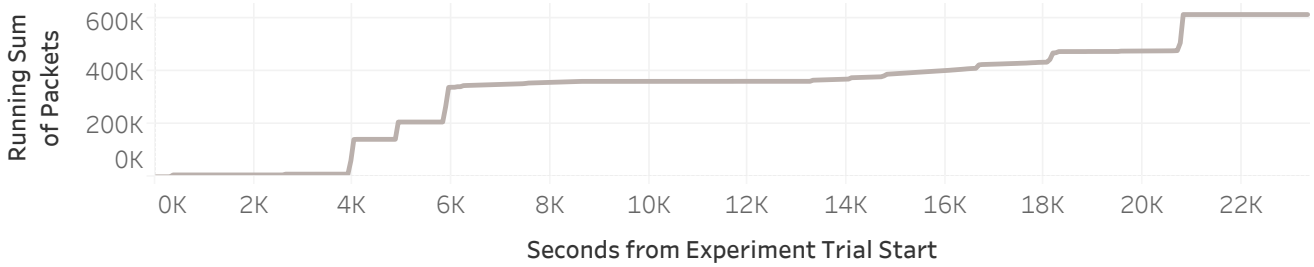
Real Packets per Minute



Real System Interaction Timeline

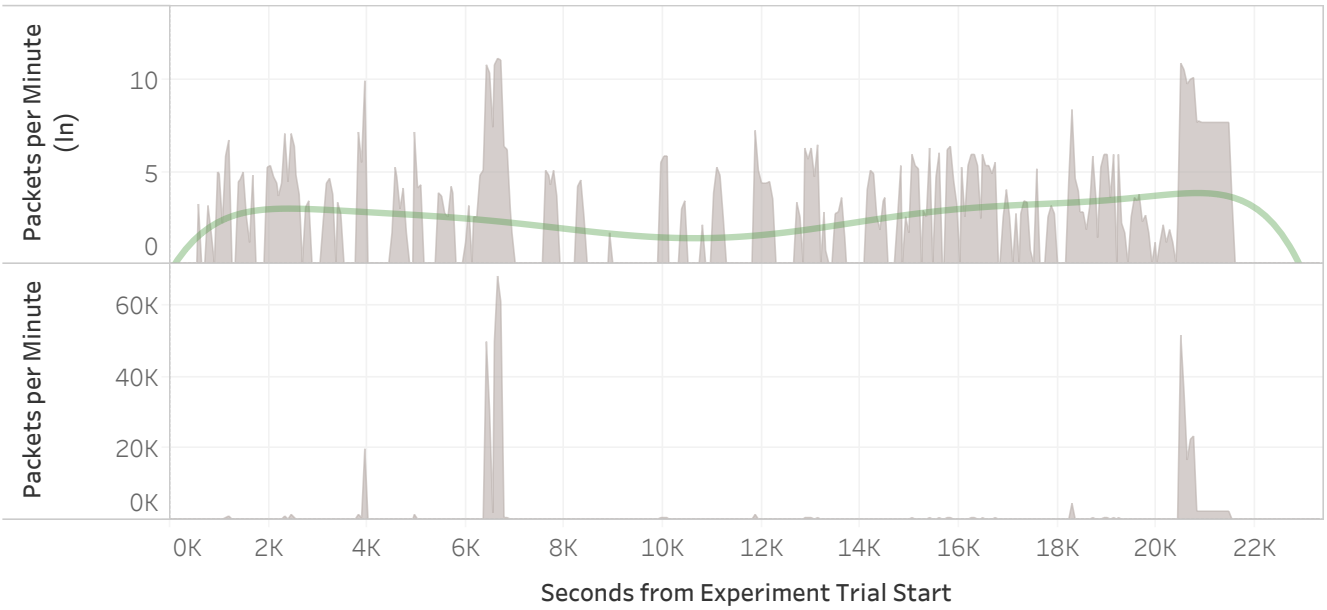


Running Sum of Packets

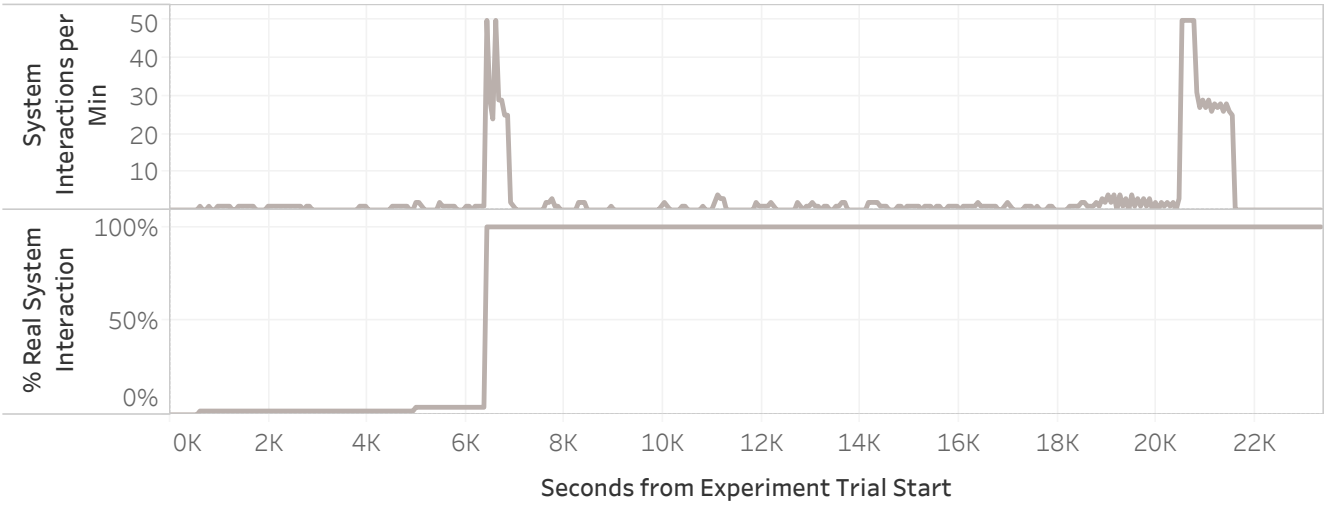


S102 - Day 1 - AU

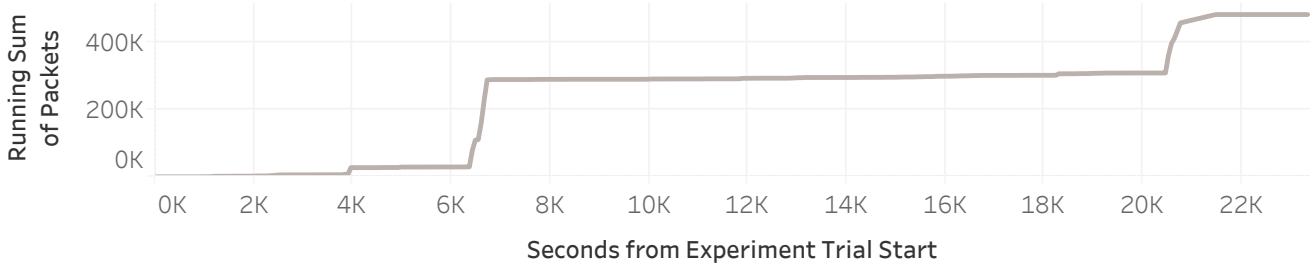
Real Packets per Minute



Real System Interaction Timeline

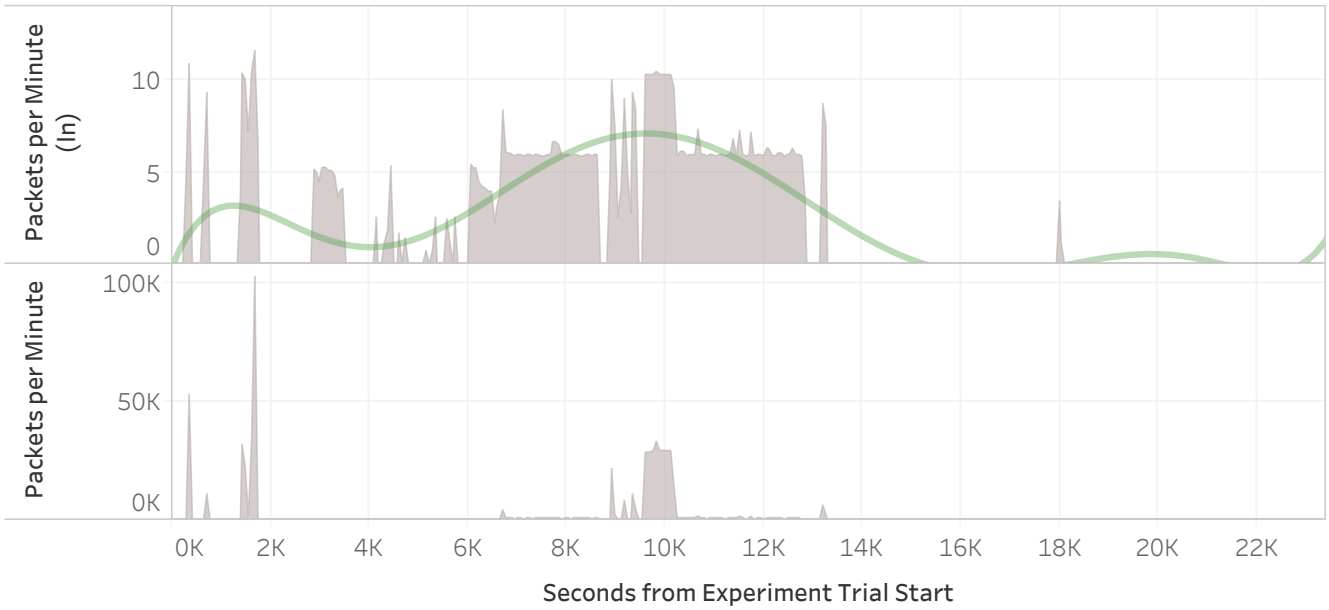


Running Sum of Packets

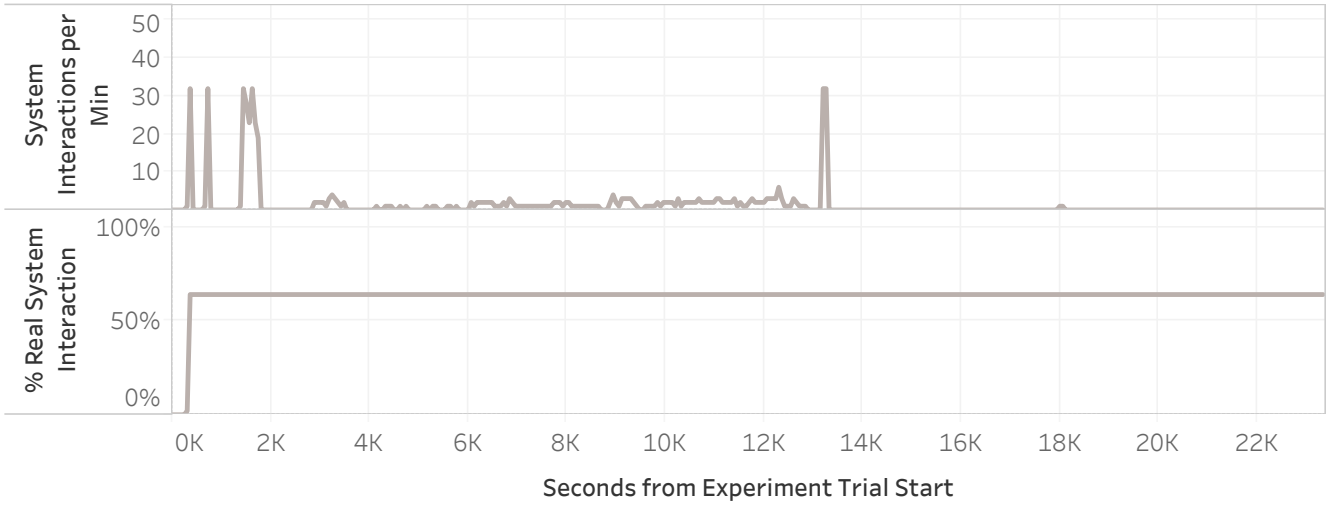


S103 - Day 1 - AU

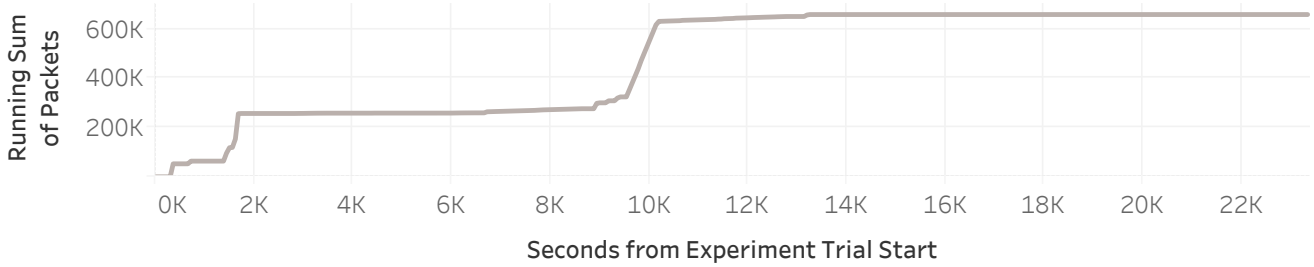
Real Packets per Minute



Real System Interaction Timeline

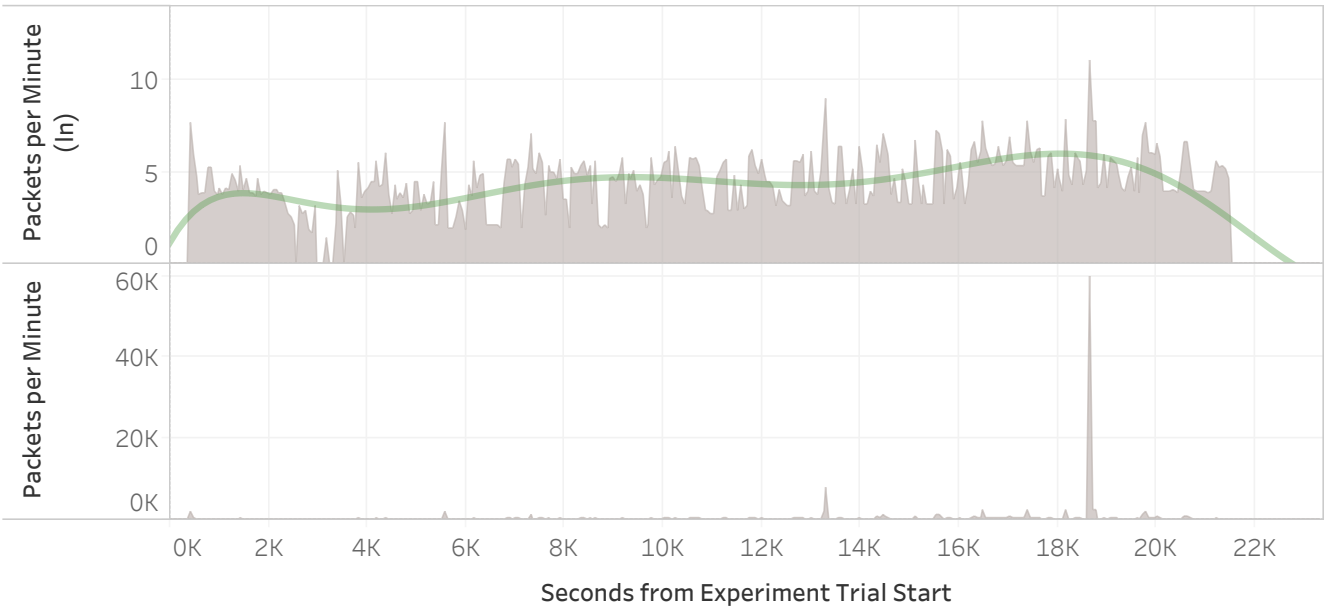


Running Sum of Packets

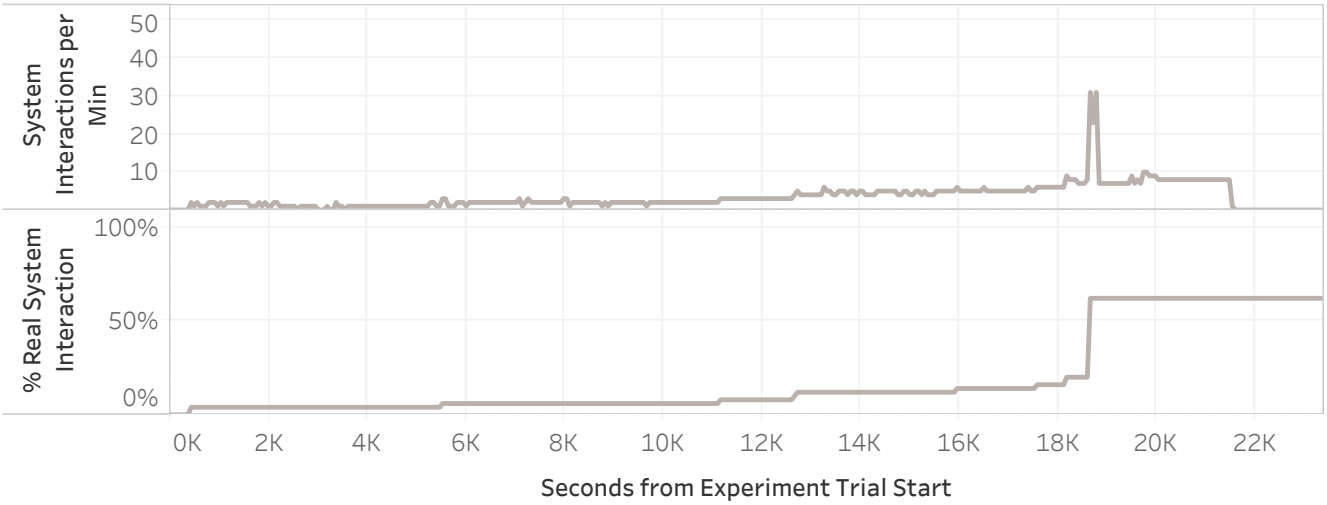


S104 - Day 1 - AU

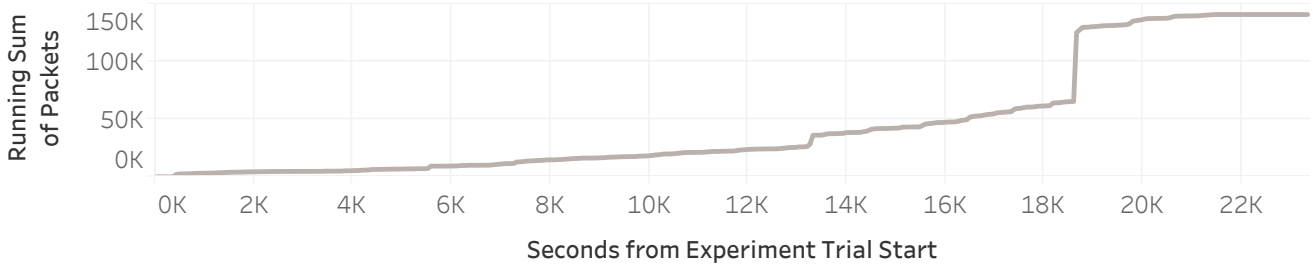
Real Packets per Minute



Real System Interaction Timeline

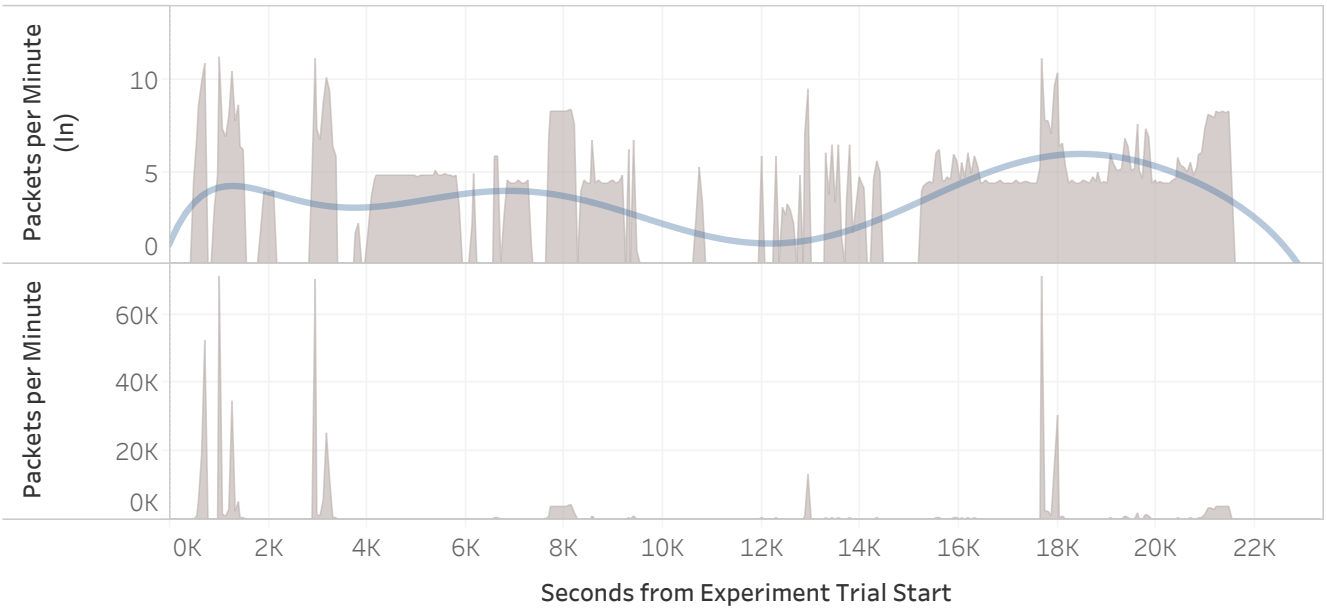


Running Sum of Packets

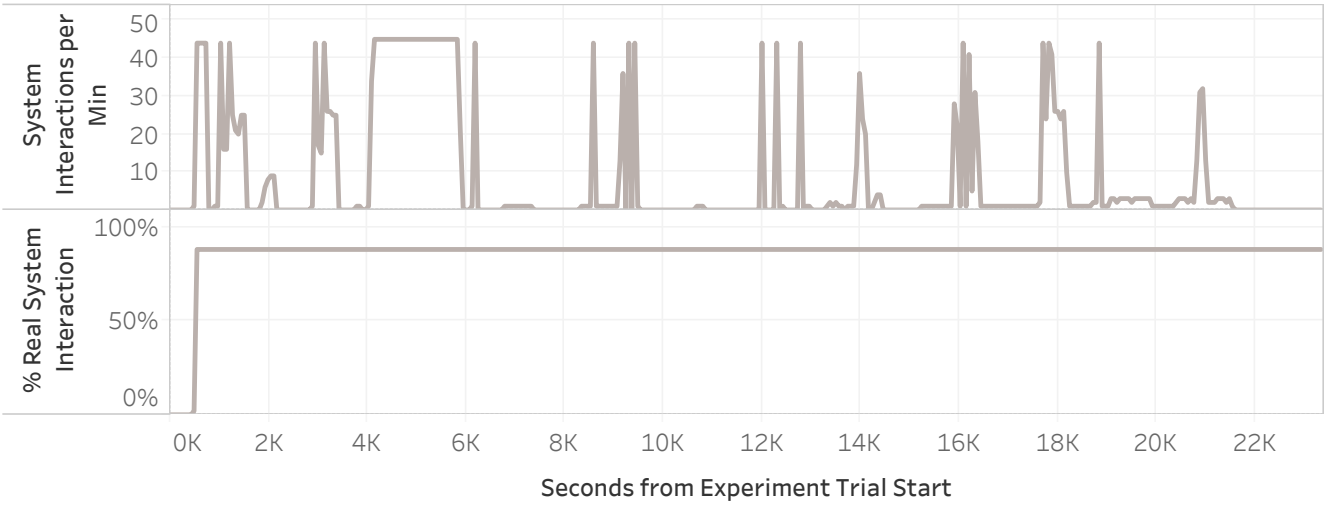


S105 - Day 1 - AI

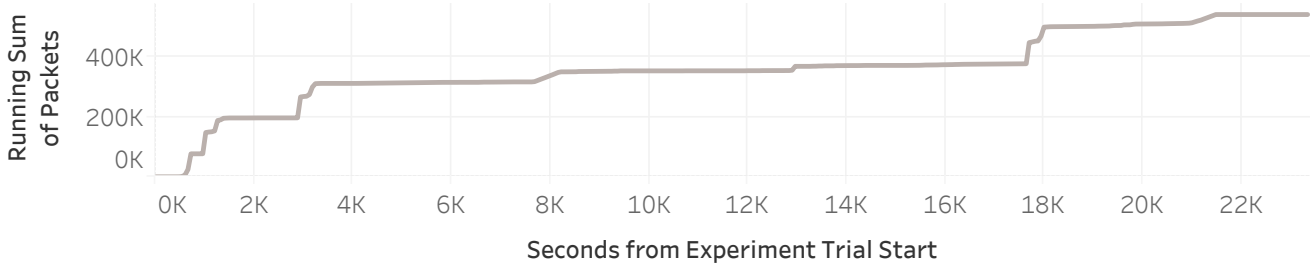
Real Packets per Minute



Real System Interaction Timeline

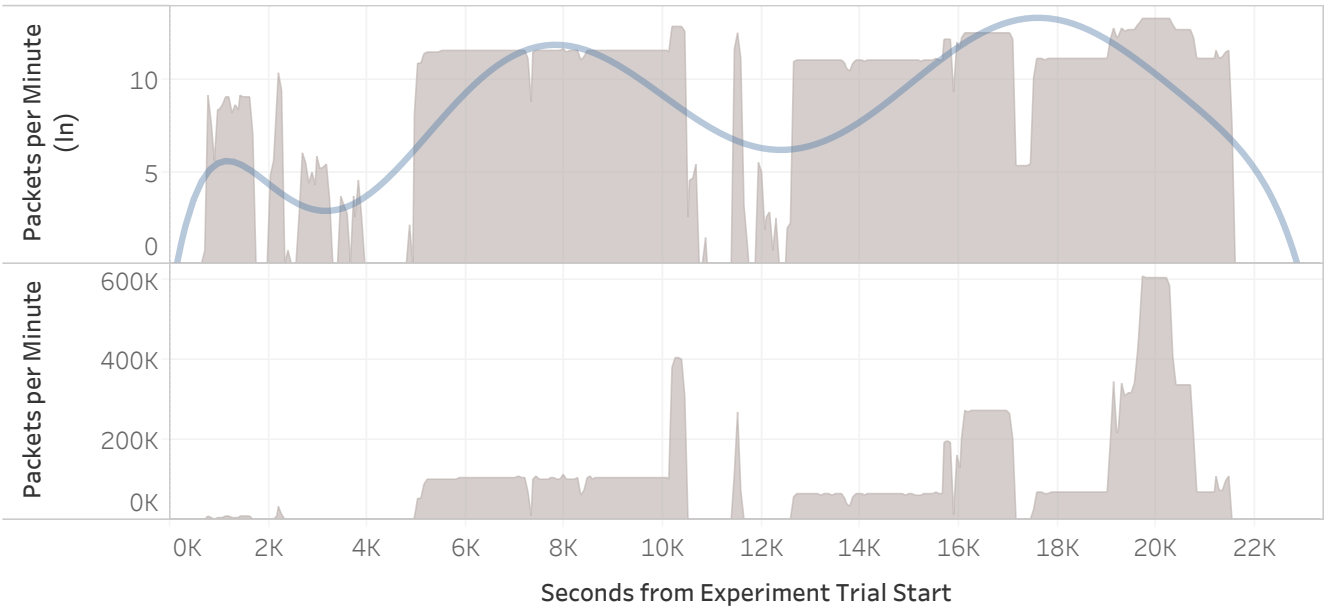


Running Sum of Packets

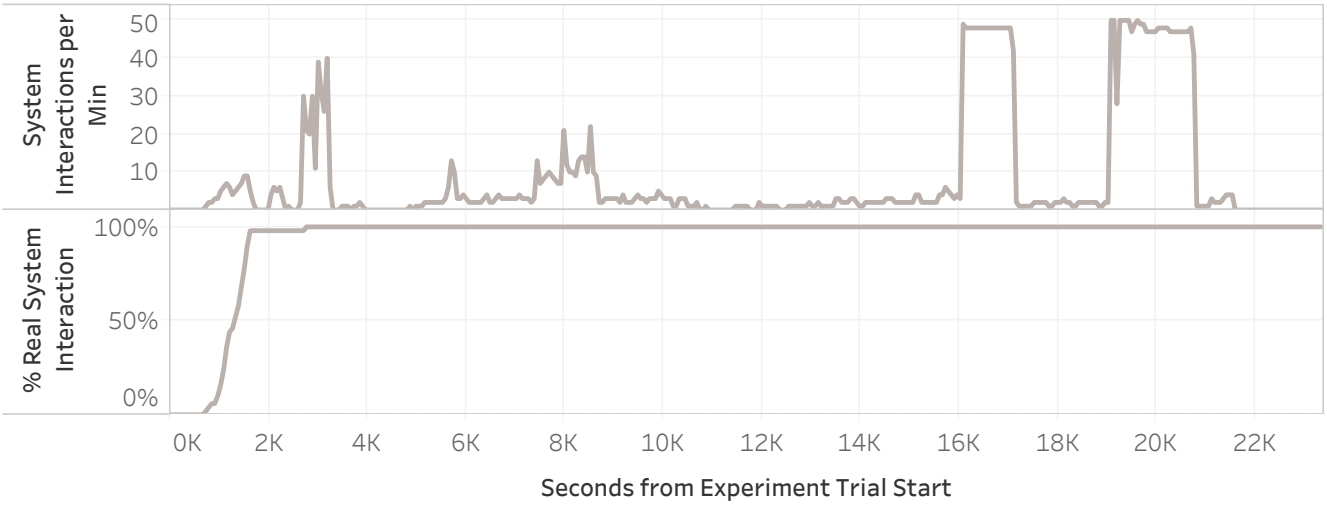


S106 - Day 1 - AI

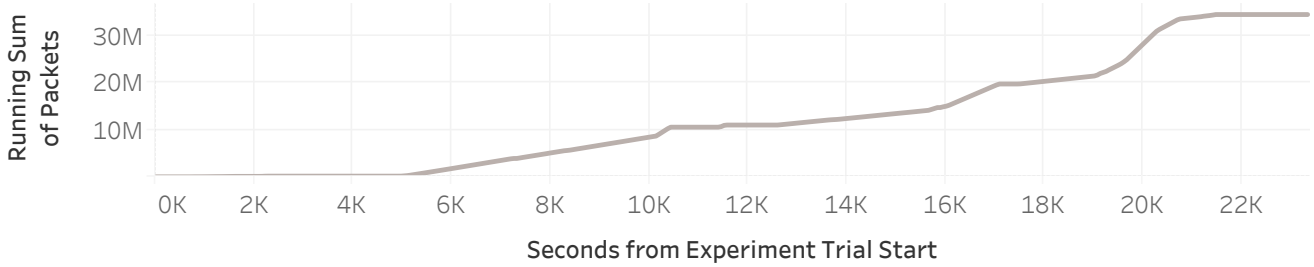
Real Packets per Minute



Real System Interaction Timeline

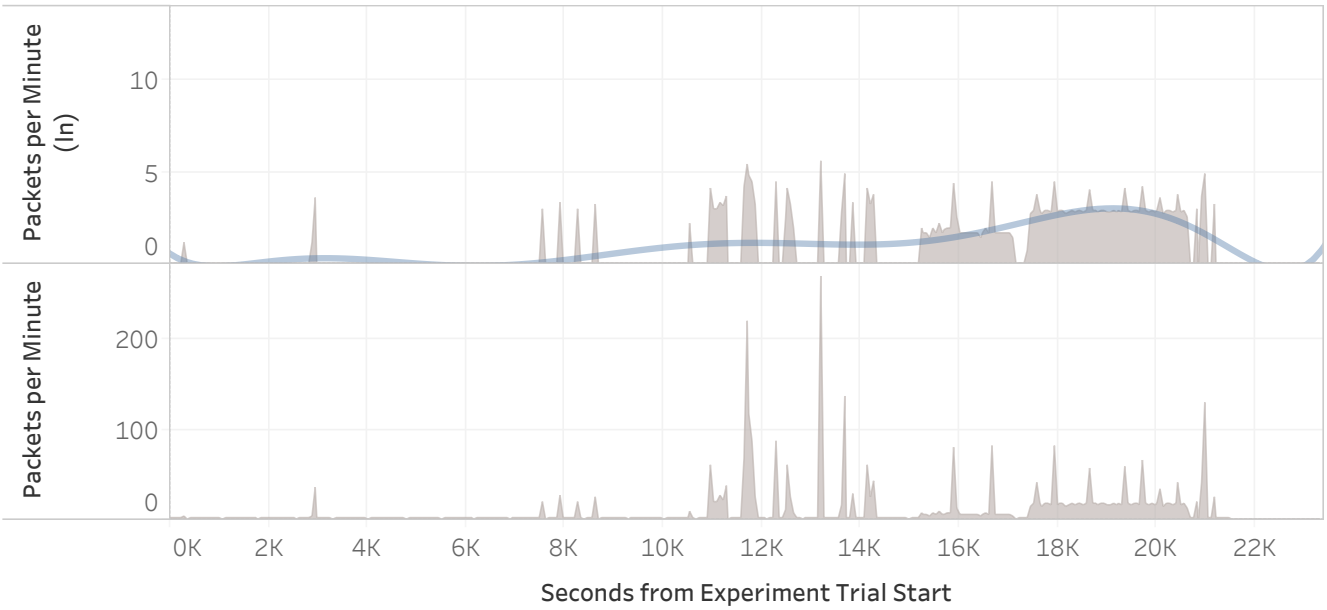


Running Sum of Packets

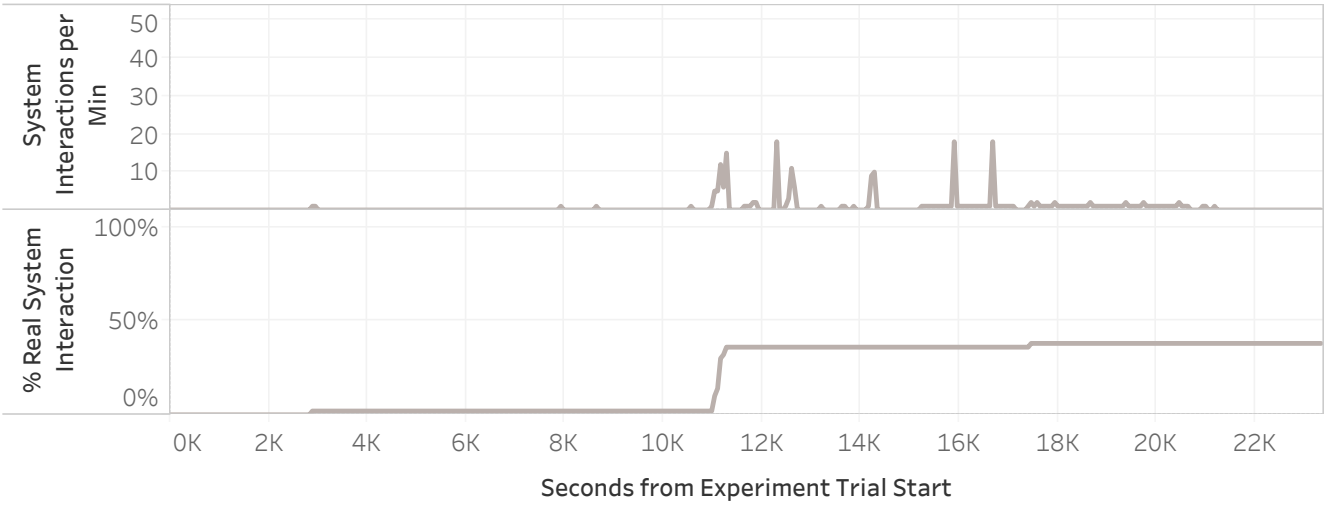


S107 - Day 1 - AI

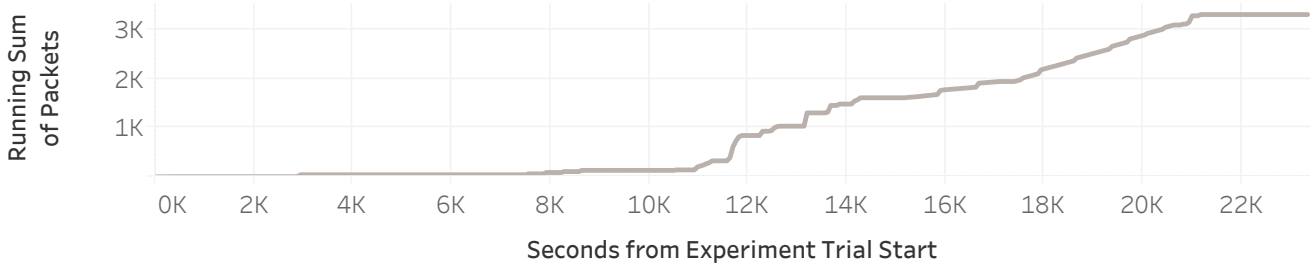
Real Packets per Minute



Real System Interaction Timeline

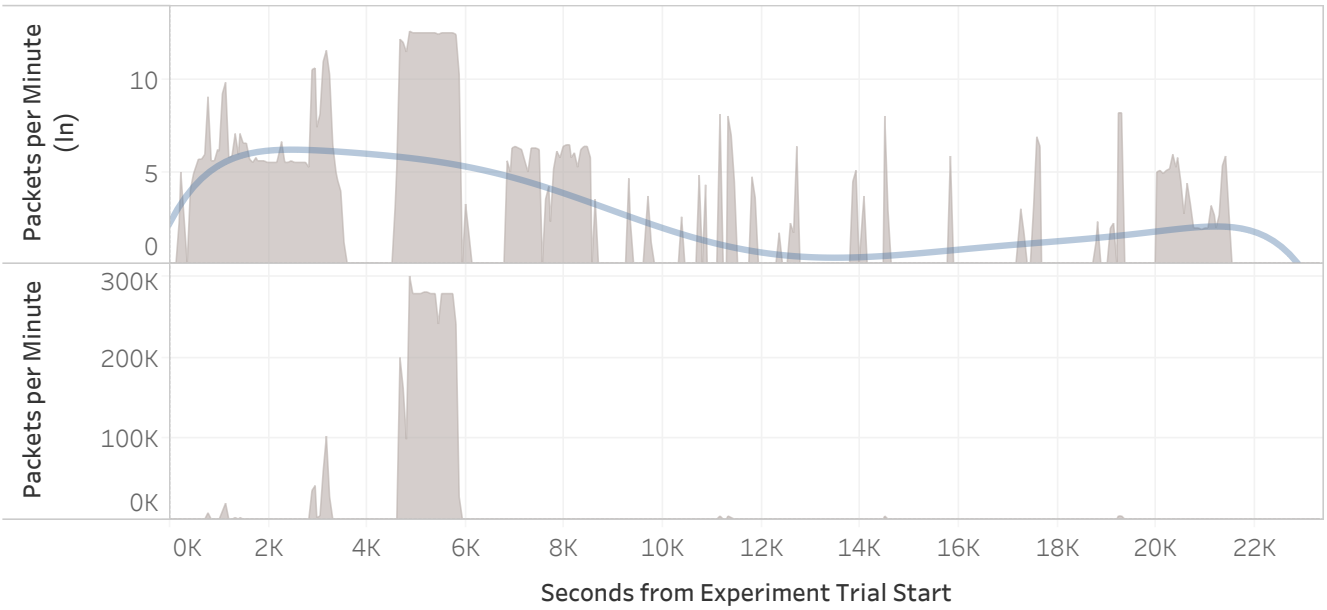


Running Sum of Packets

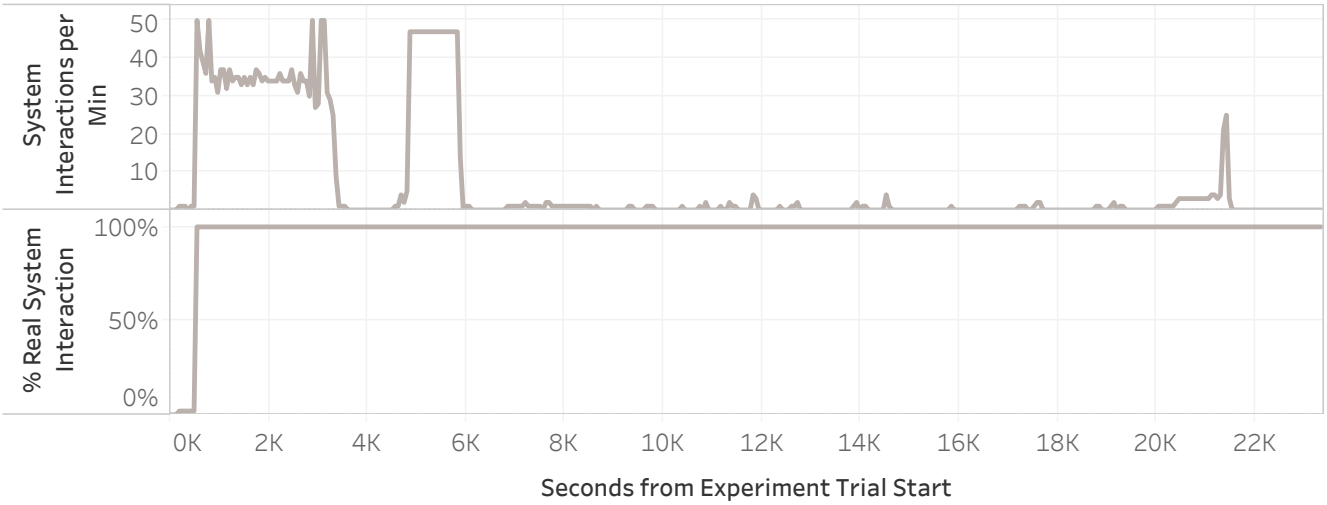


S108 - Day 1 - AI

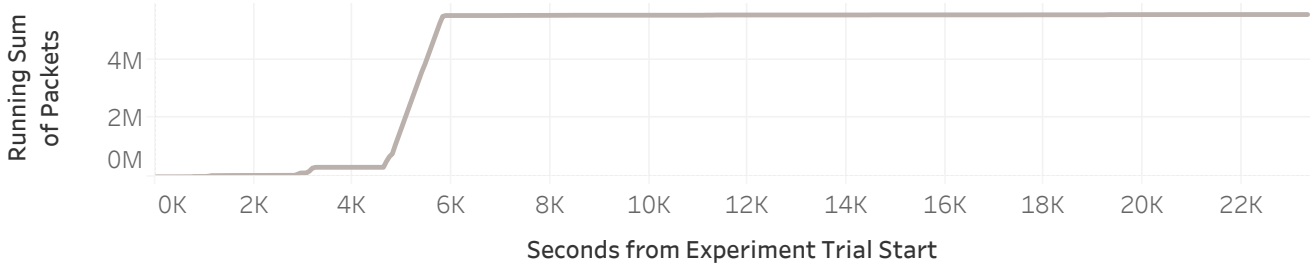
Real Packets per Minute



Real System Interaction Timeline

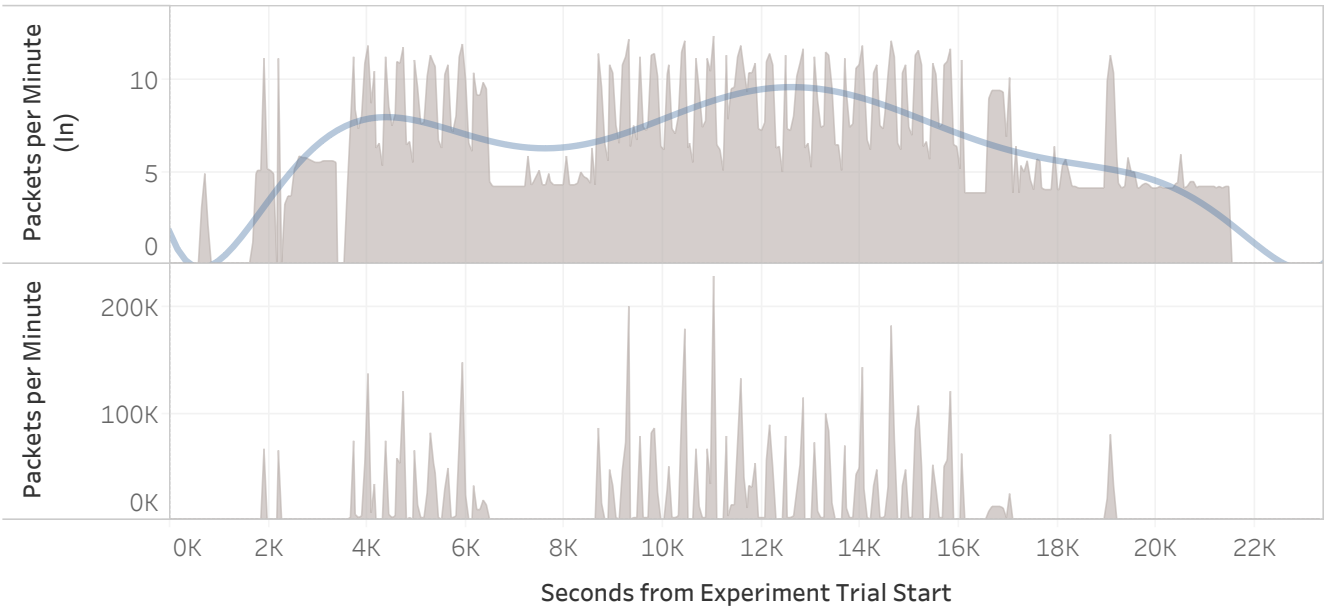


Running Sum of Packets

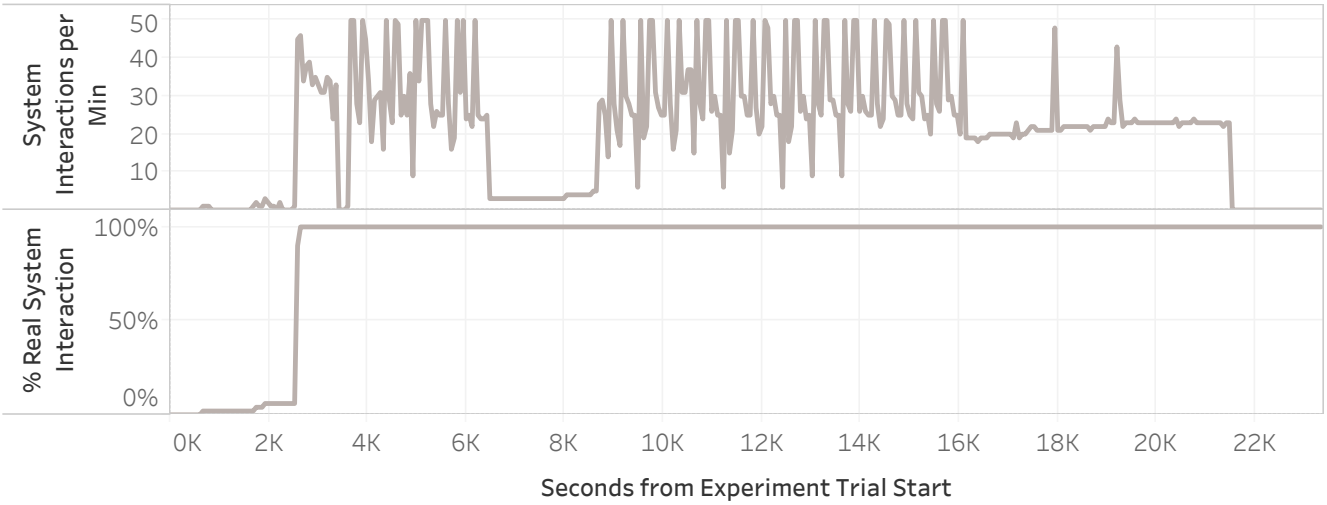


S109 - Day 1 - AI

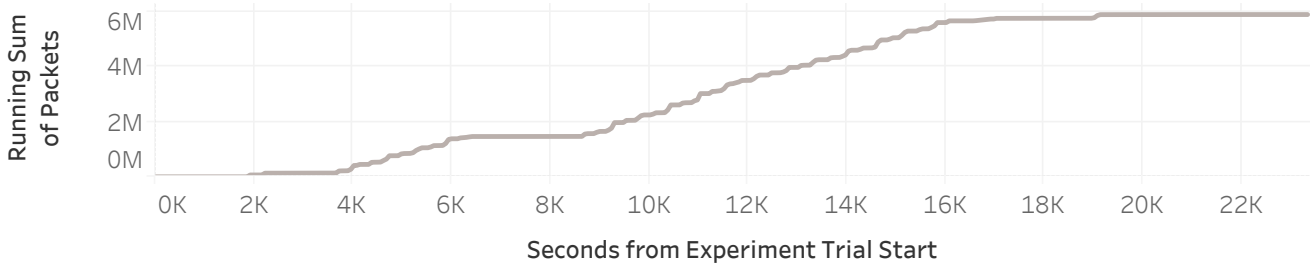
Real Packets per Minute



Real System Interaction Timeline

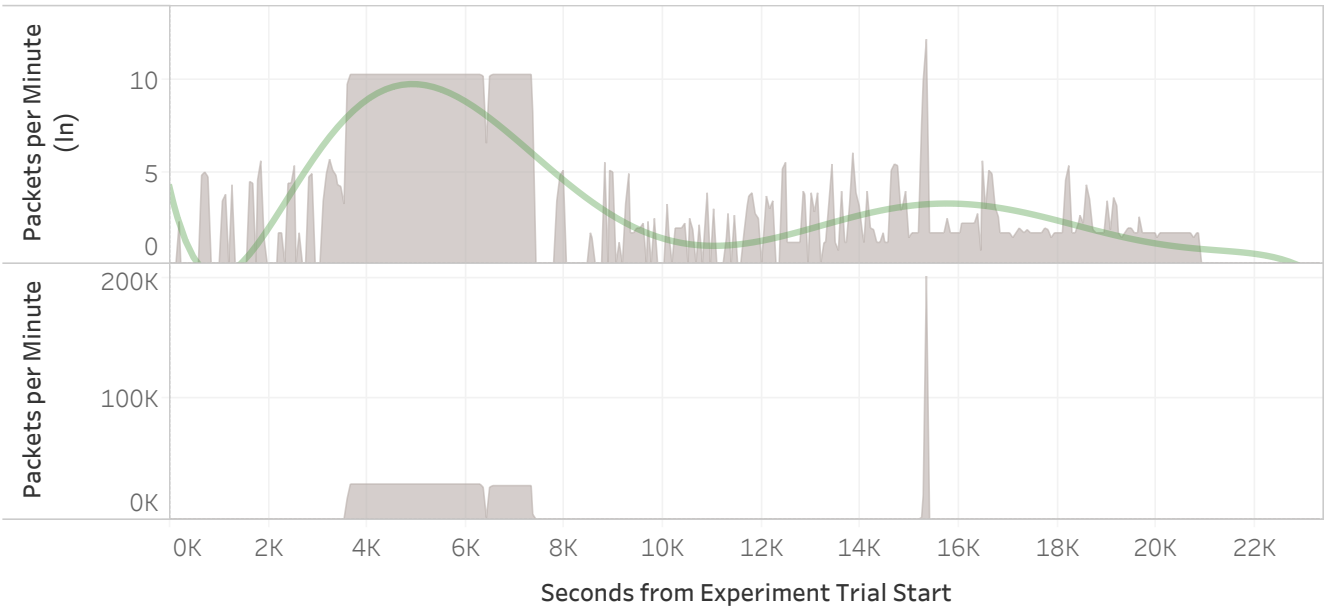


Running Sum of Packets

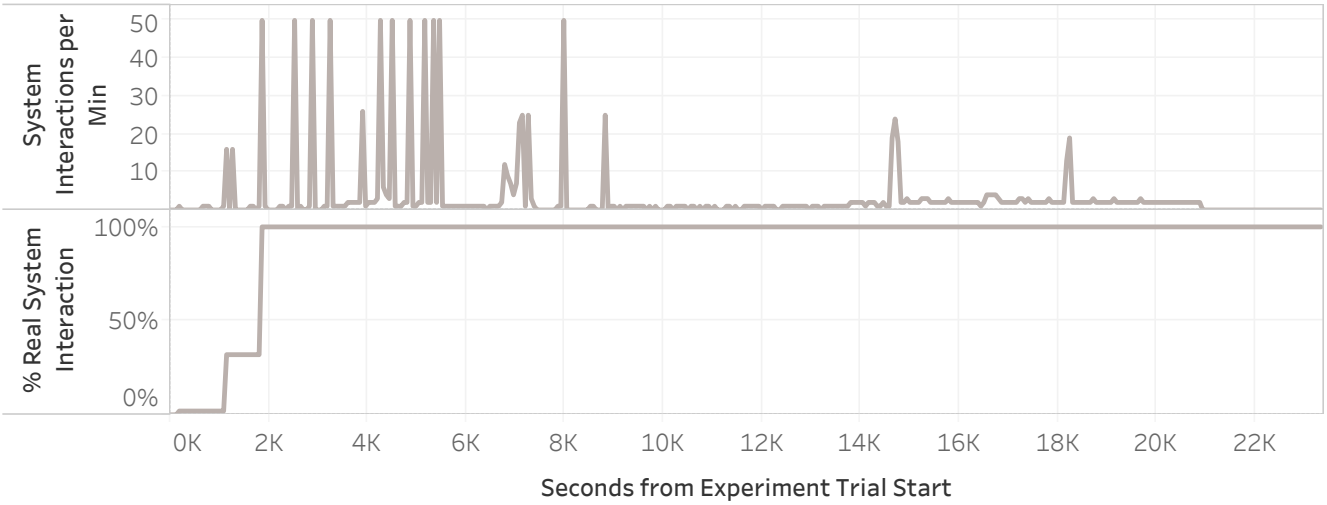


S111 - Day 1 - AU

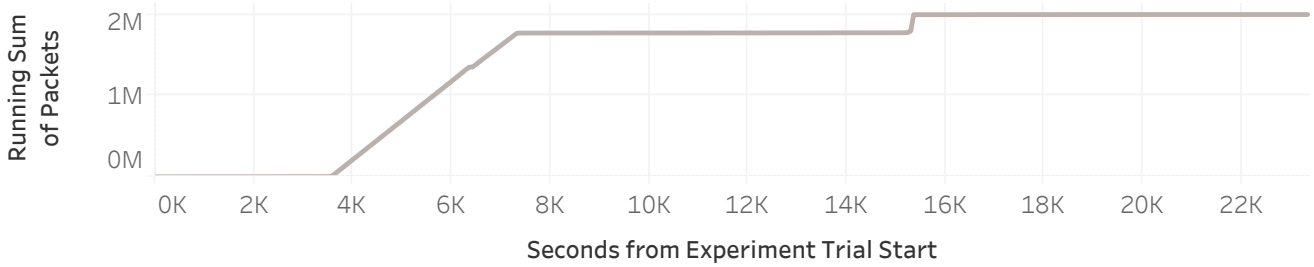
Real Packets per Minute



Real System Interaction Timeline

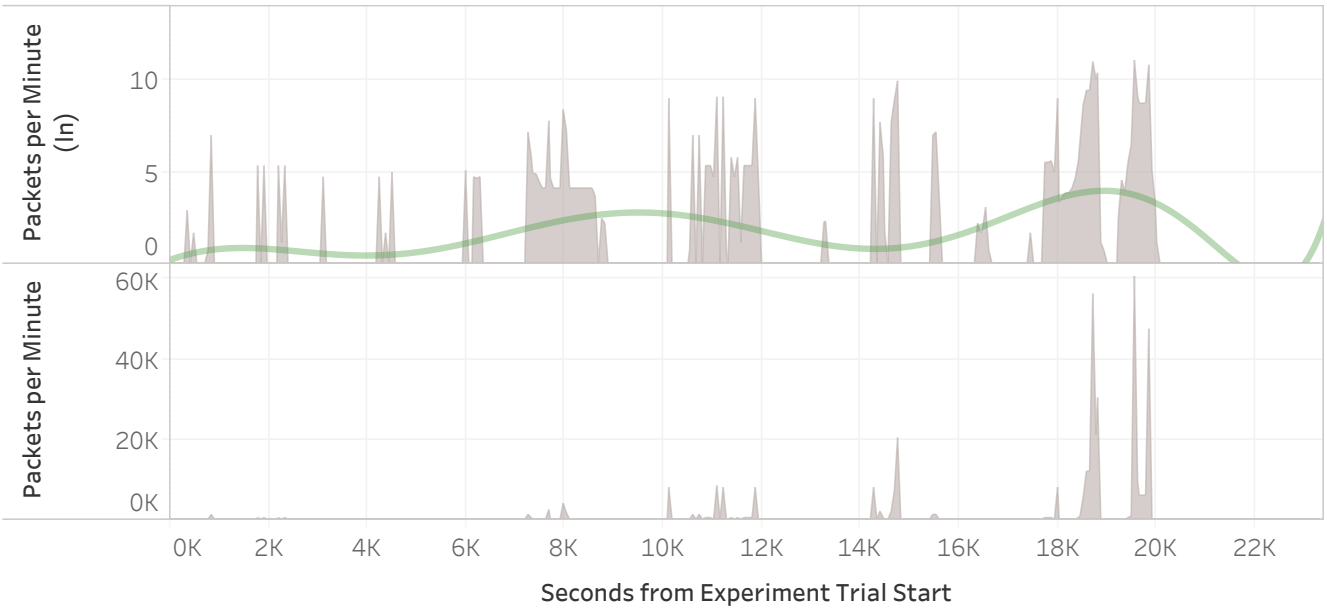


Running Sum of Packets

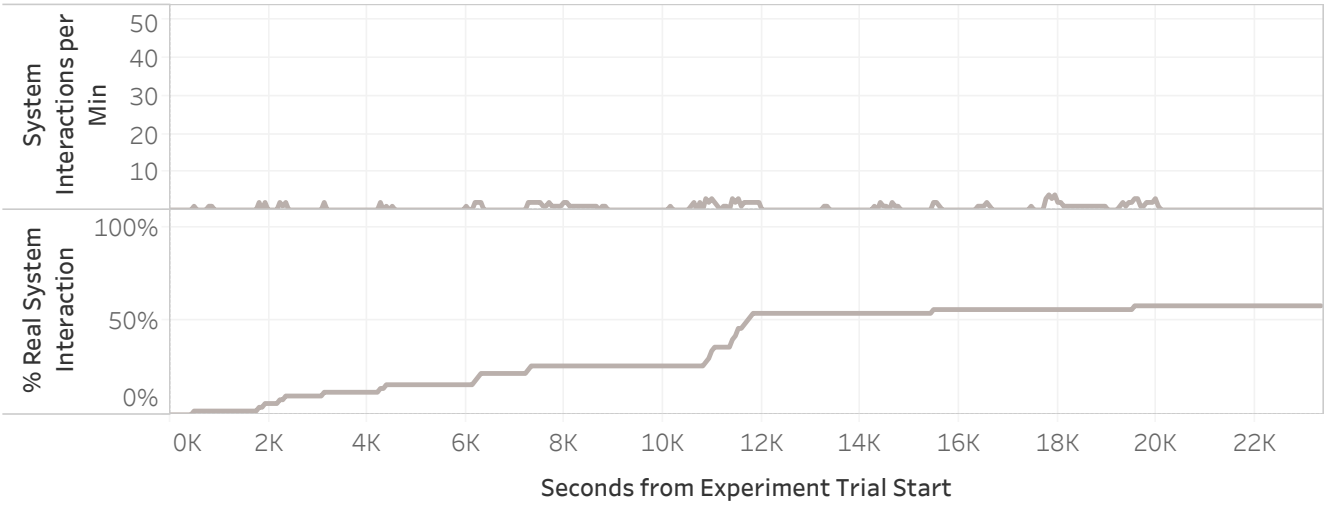


S112 - Day 1 - AU

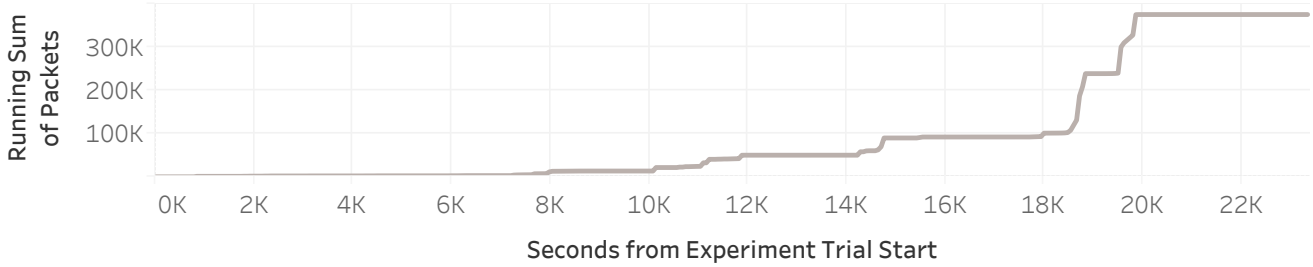
Real Packets per Minute



Real System Interaction Timeline



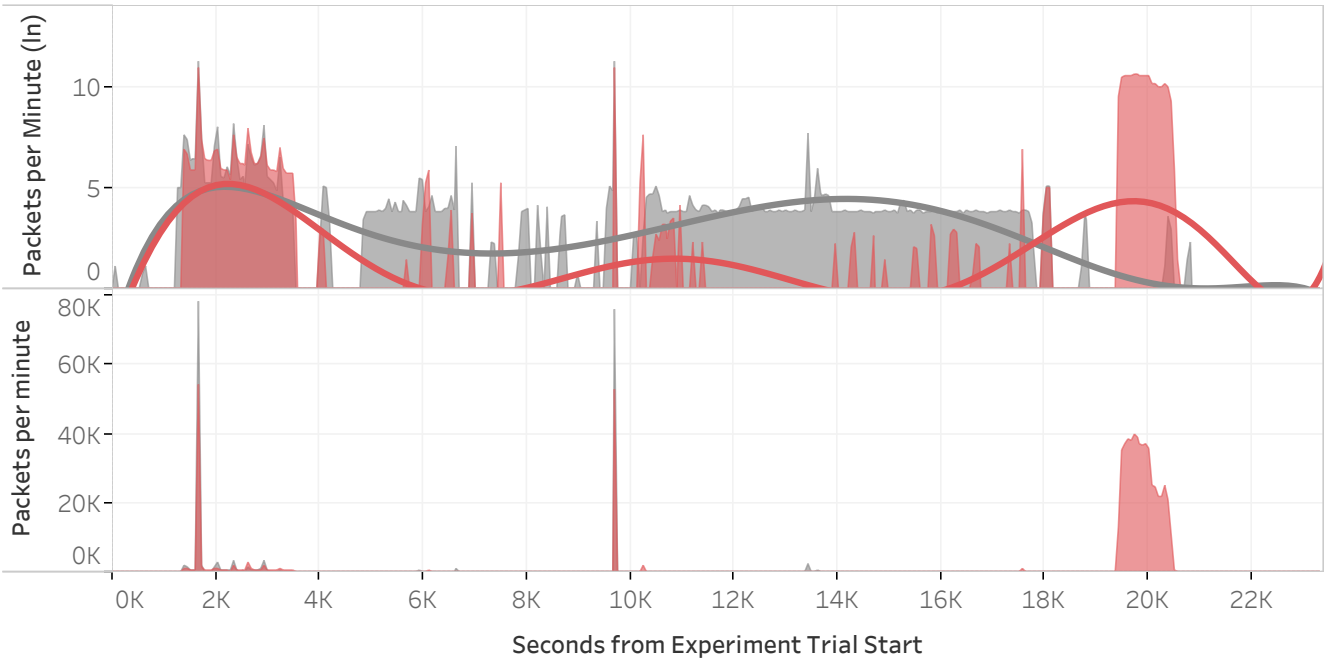
Running Sum of Packets



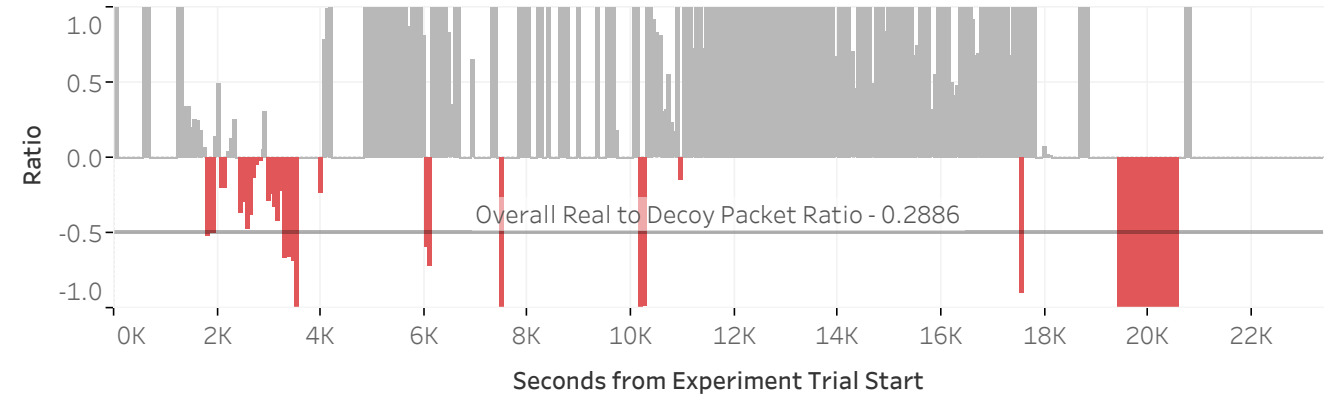
S113 - Day1 - PU

Legend
Real Systems
Decoy Systems

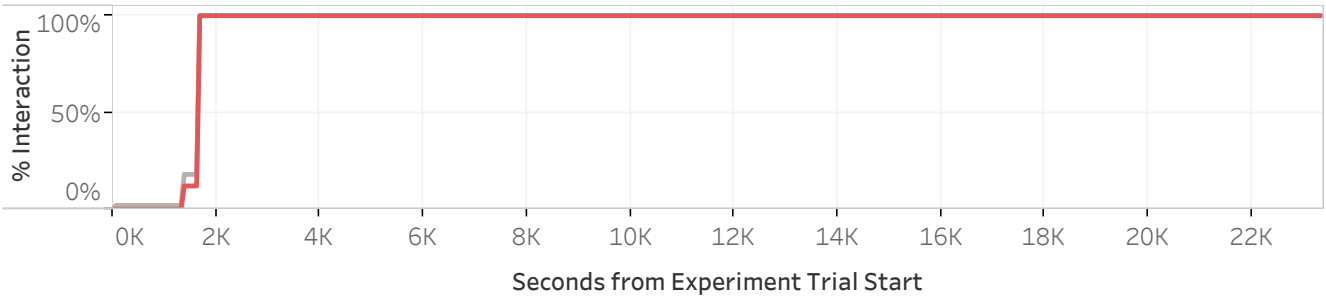
Real & Decoy Packets per Minute

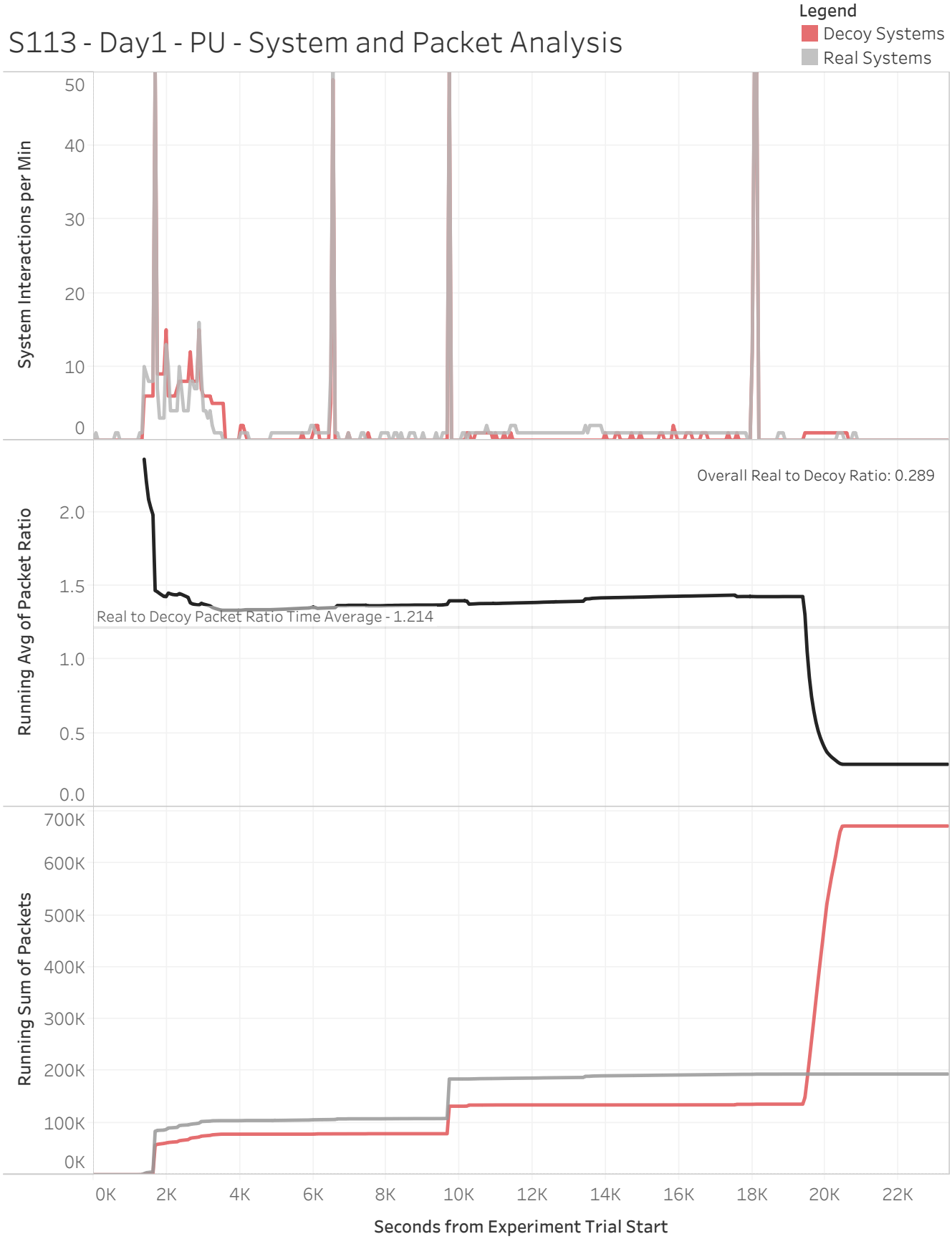


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

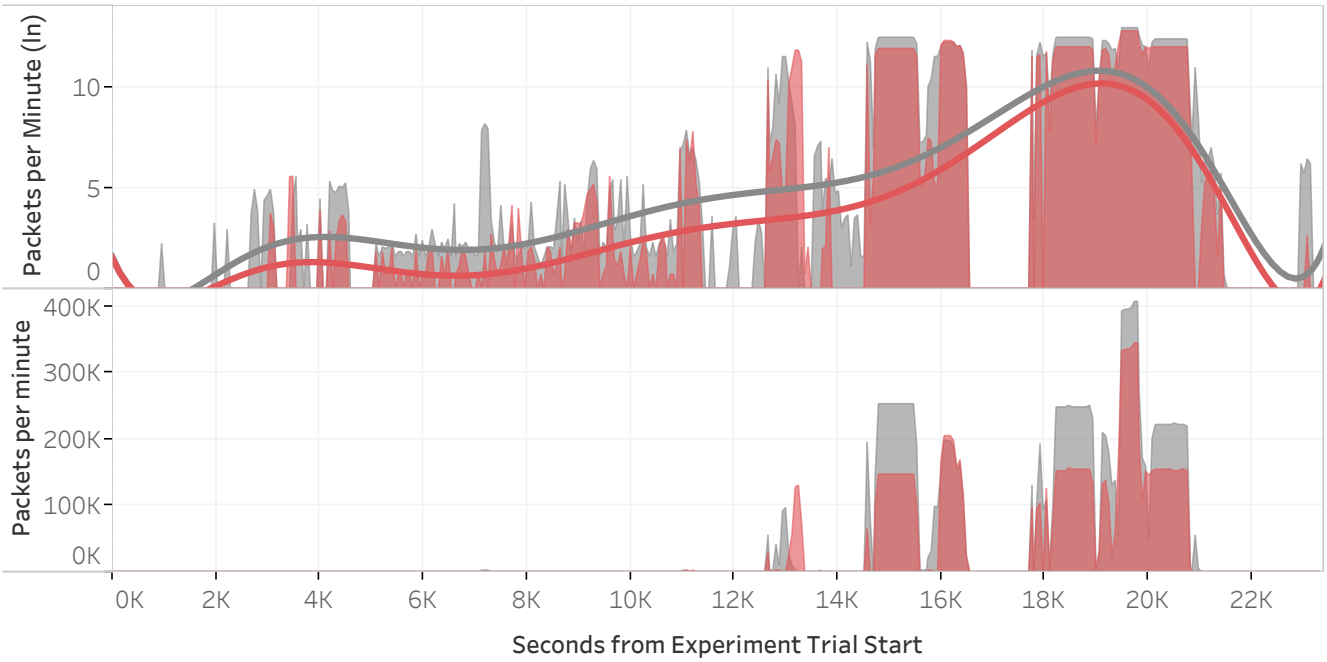



S113 - Day1 - PU - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
Overall Real to Decoy Ratio: 0.289
Real to Decoy Packet Ratio Time Average - 1.214
2.0
1.5
1.0
0.5
0.0
Running Sum of Packets
700K
600K
500K
400K
300K
200K
100K
0K
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

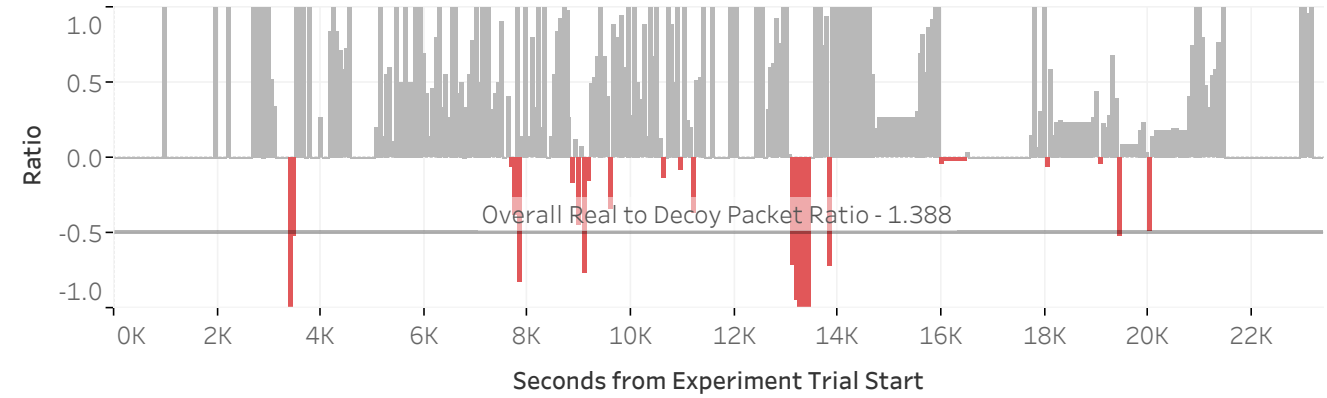
S114 - Day1 - PU

Legend
Real Systems
Decoy Systems

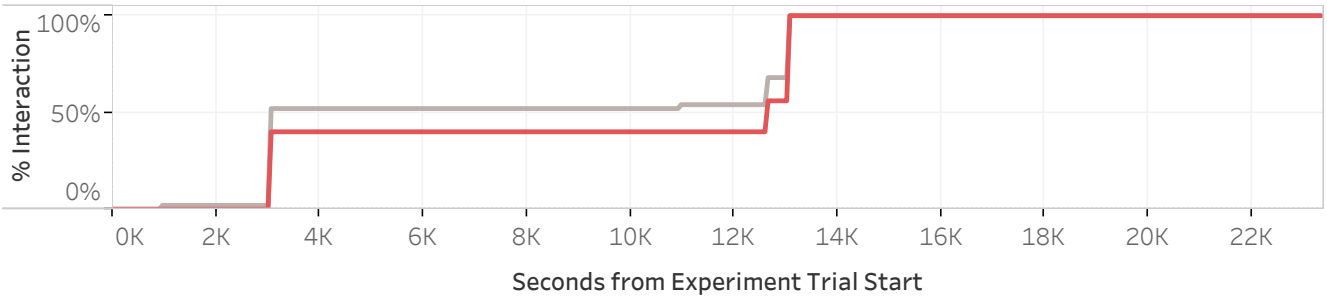
Real & Decoy Packets per Minute

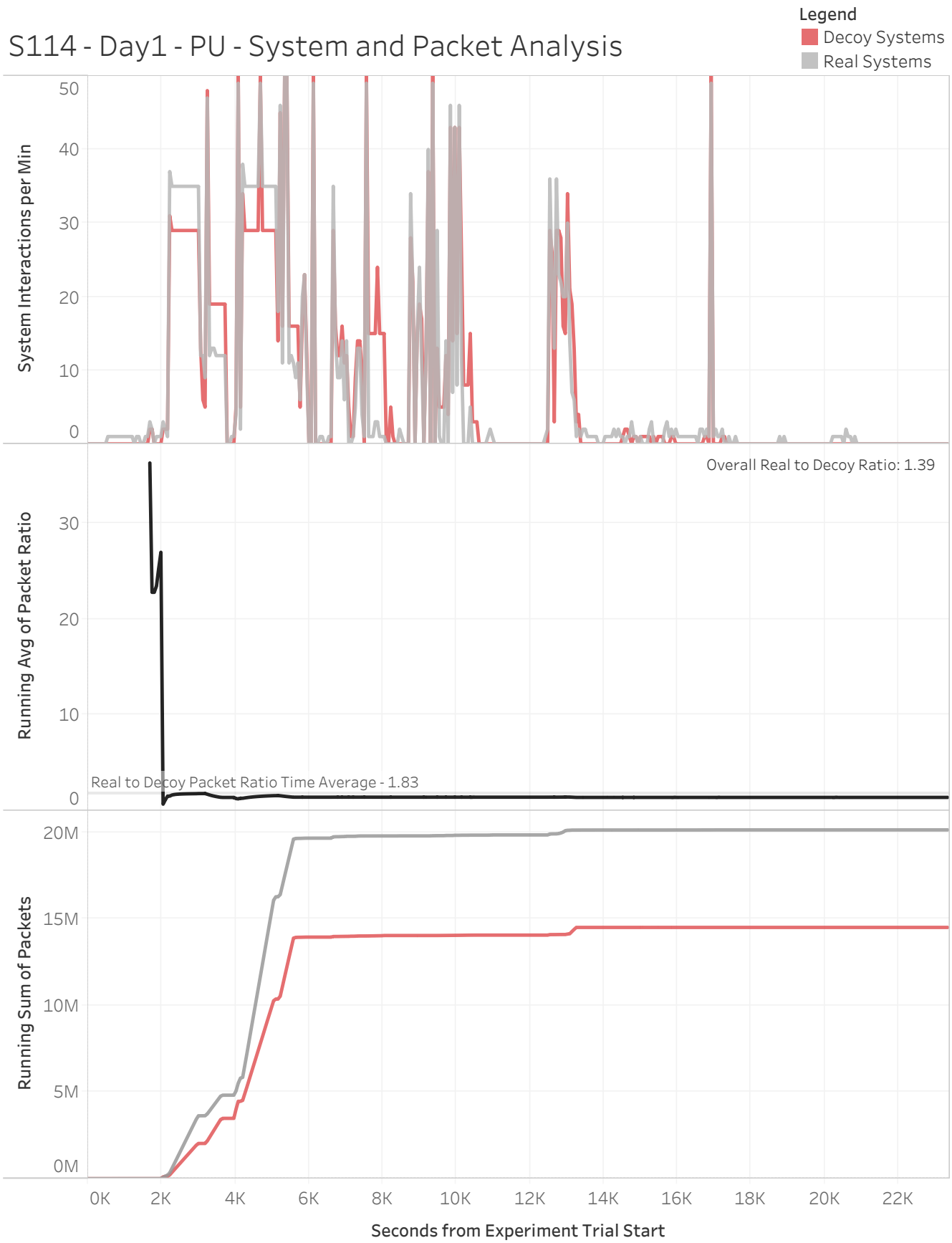


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

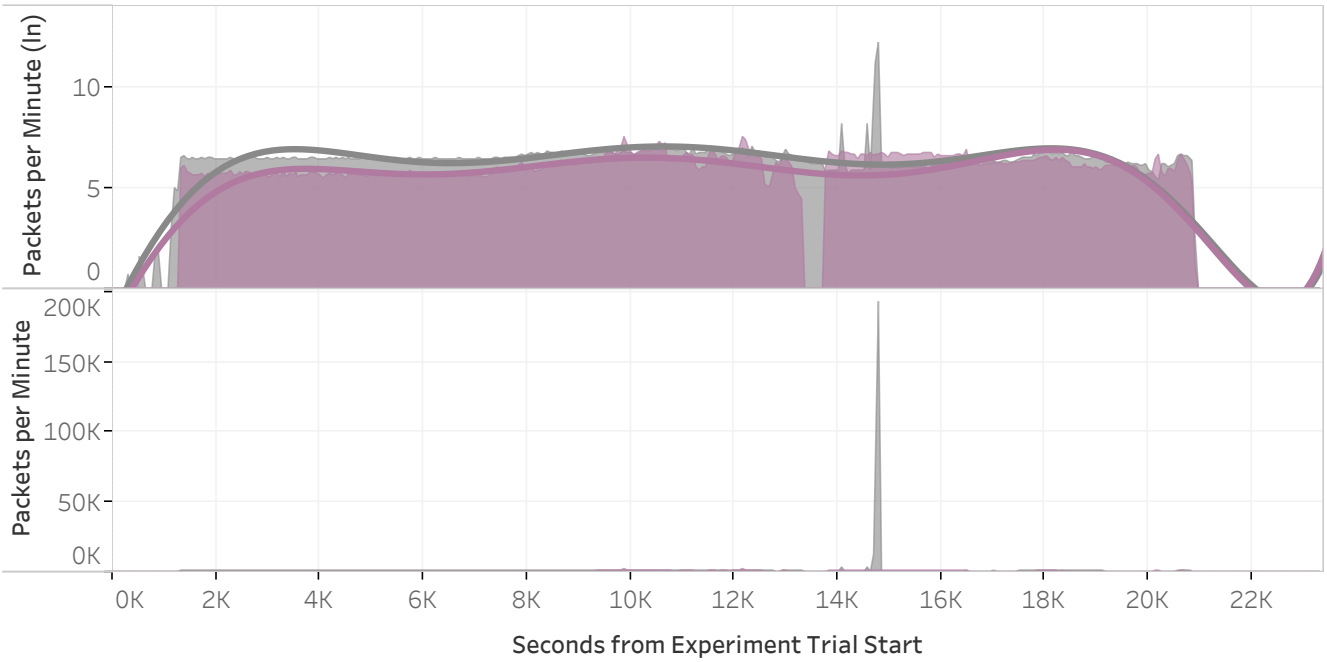



S114 - Day1 - PU - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Overall Real to Decoy Ratio: 1.39
Running Avg of Packet Ratio
30
20
10
0
Real to Decoy Packet Ratio Time Average - 1.83
Running Sum of Packets
20M
15M
10M
5M
0M
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

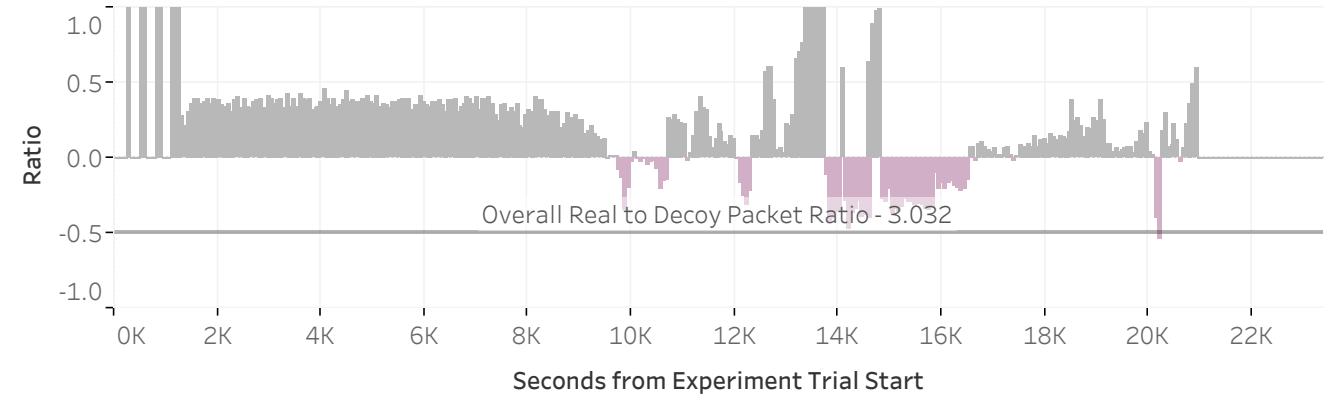
S115- Day1 - PI

Legend
Real Systems
Decoy Systems

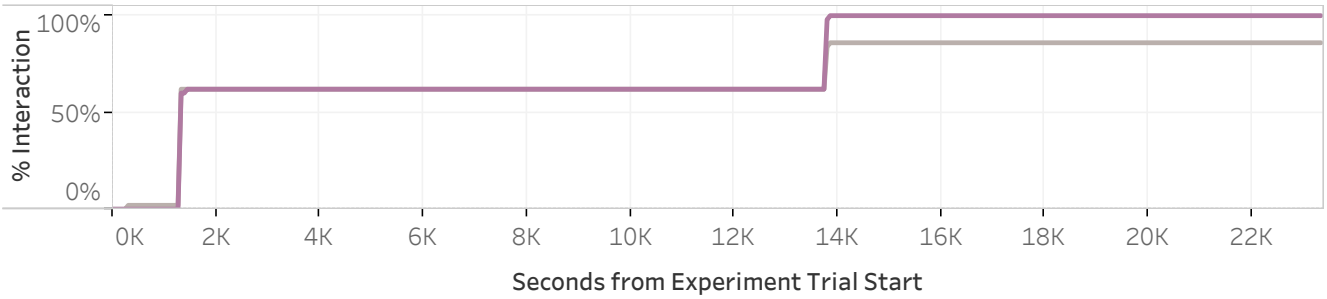
Real & Decoy Packets per Minute

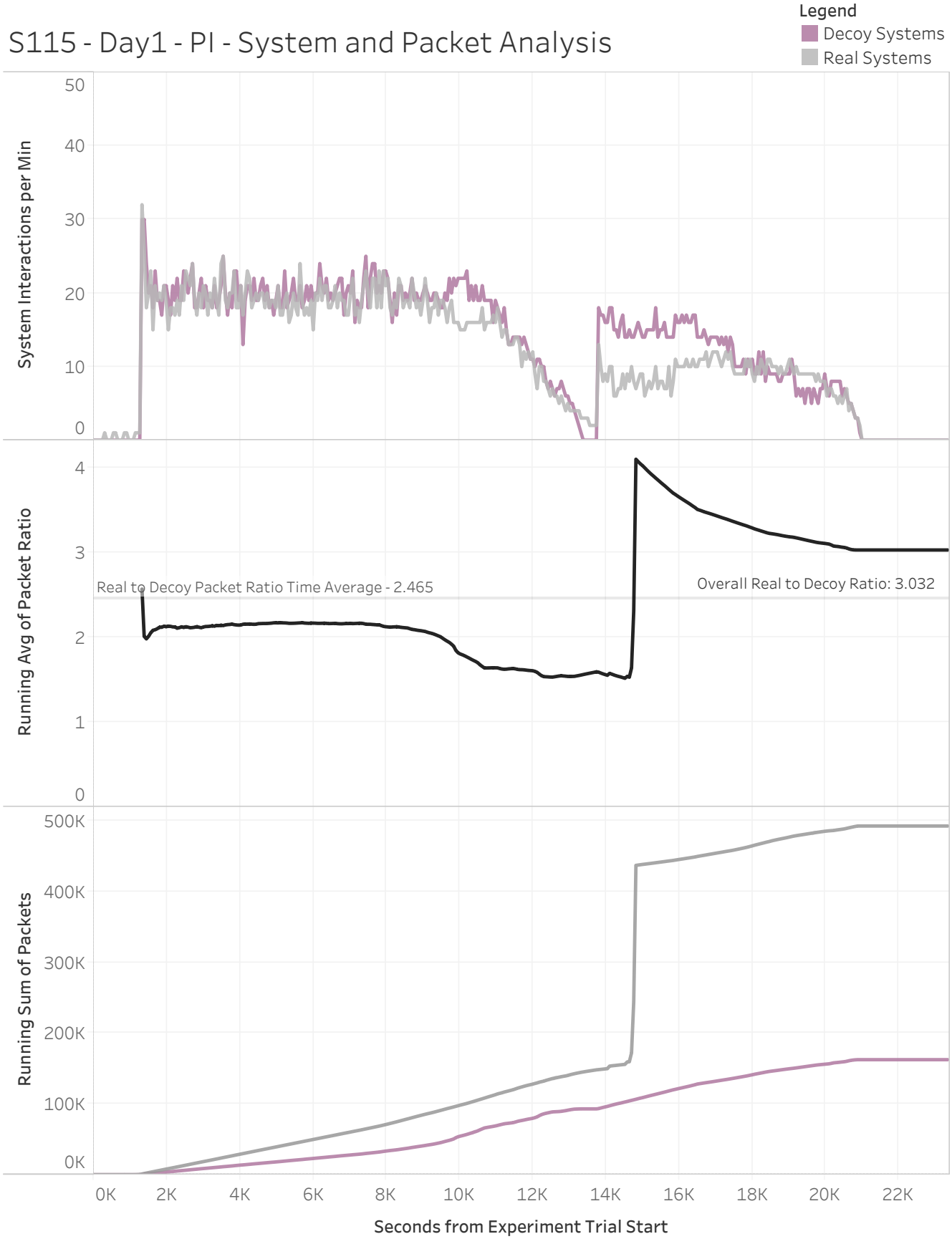


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

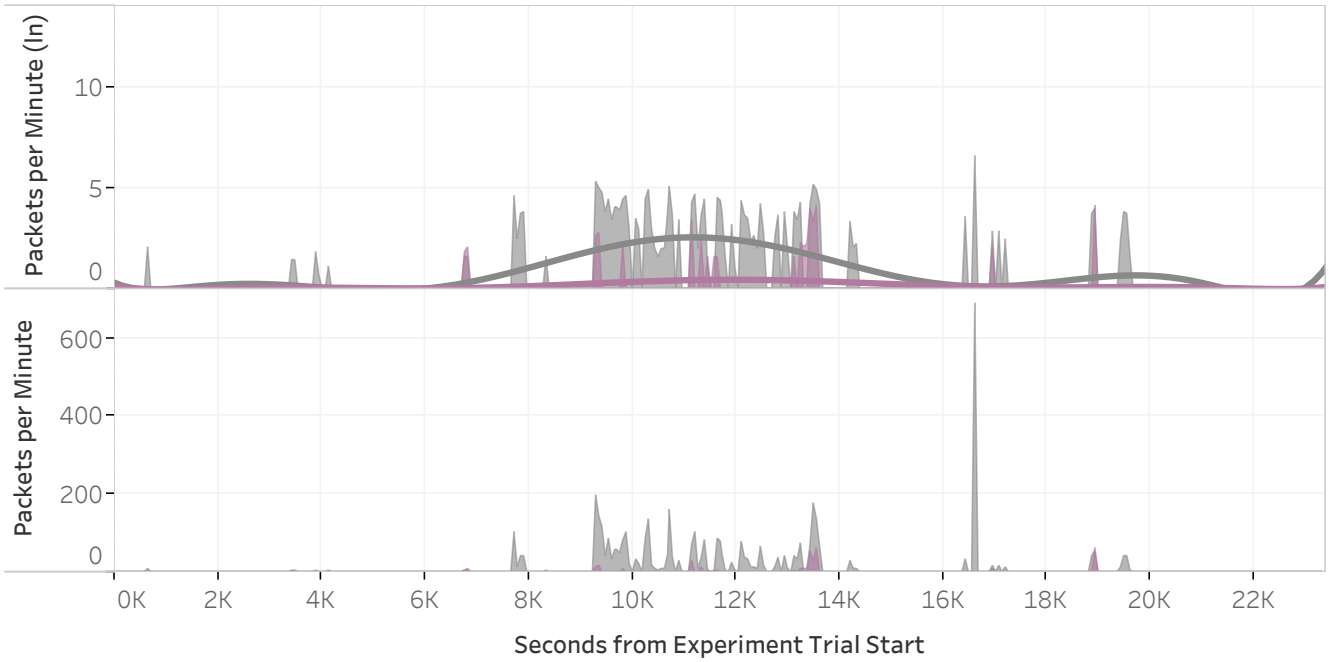



S115 - Day1 - PI - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
4
3
2
1
0
Real to Decoy Packet Ratio Time Average - 2.465
Overall Real to Decoy Ratio: 3.032
Running Sum of Packets
500K
400K
300K
200K
100K
0K
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

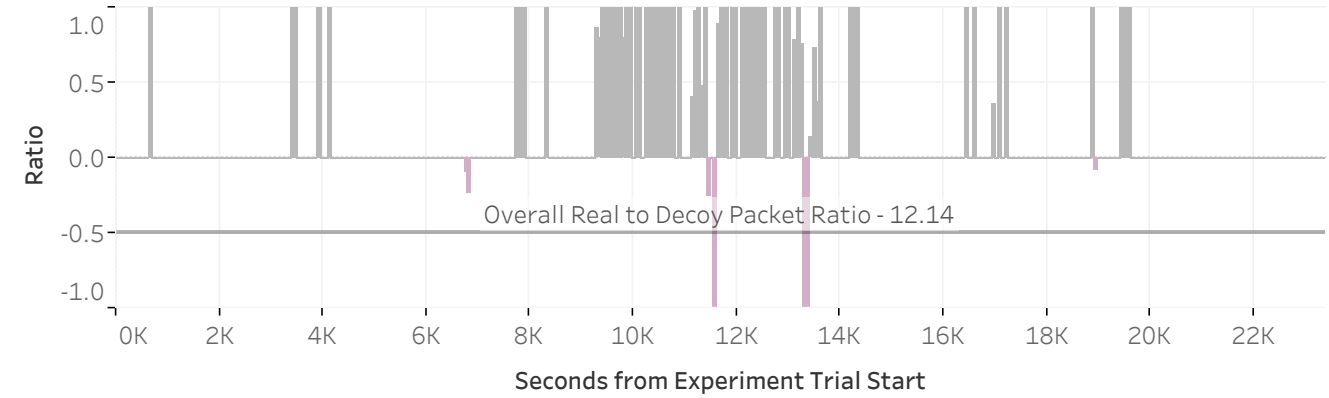
S116 - Day1 - PI

Legend
Real Systems
Decoy Systems

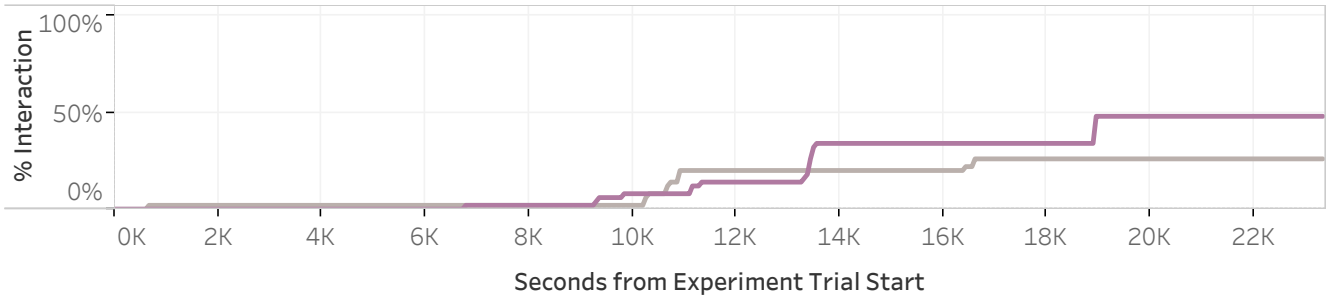
Real & Decoy Packets per Minute

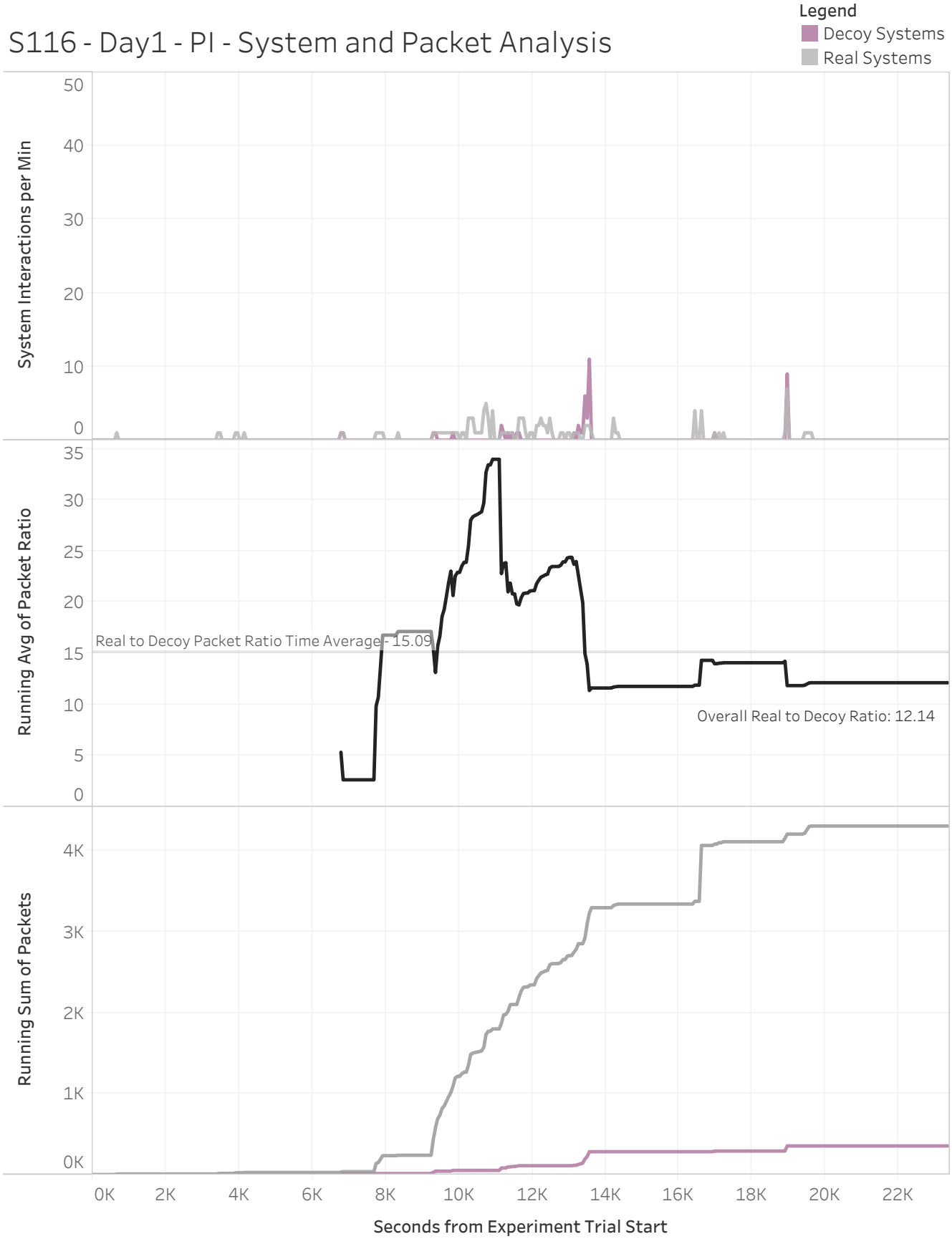


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

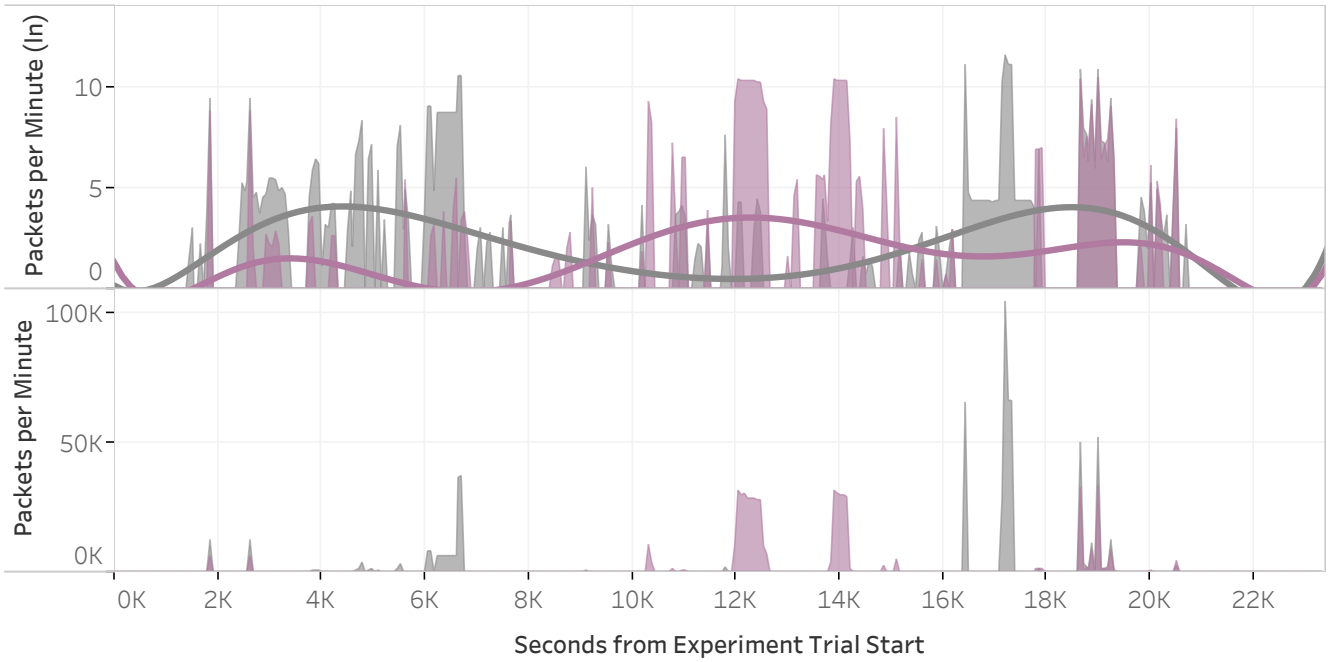



S116 - Day1 - PI - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
35
30
25
20
15
10
5
0
Real to Decoy Packet Ratio Time Average: 15.09
Overall Real to Decoy Ratio: 12.14
Running Sum of Packets
4K
3K
2K
1K
0K
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

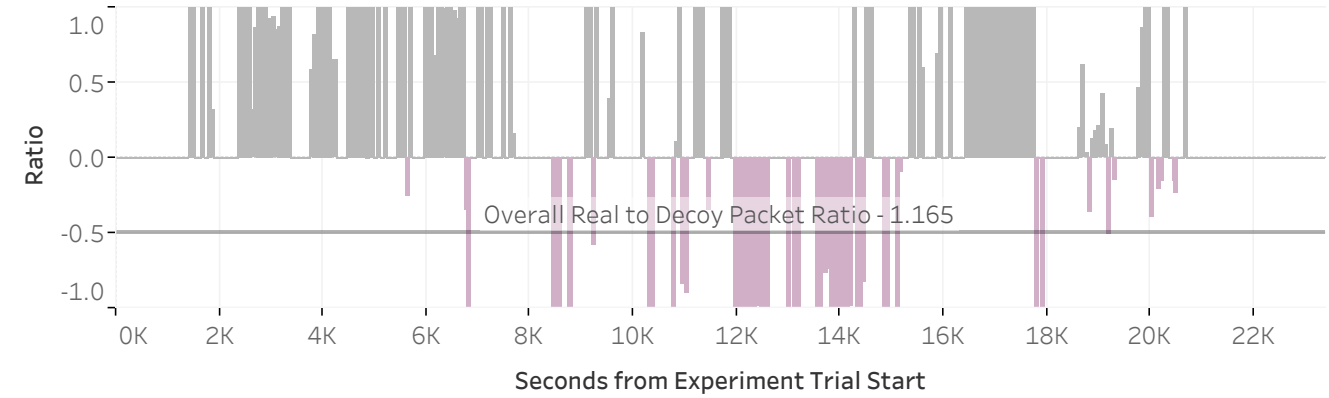
S117 - Day1 - PI

Legend
Real Systems
Decoy Systems

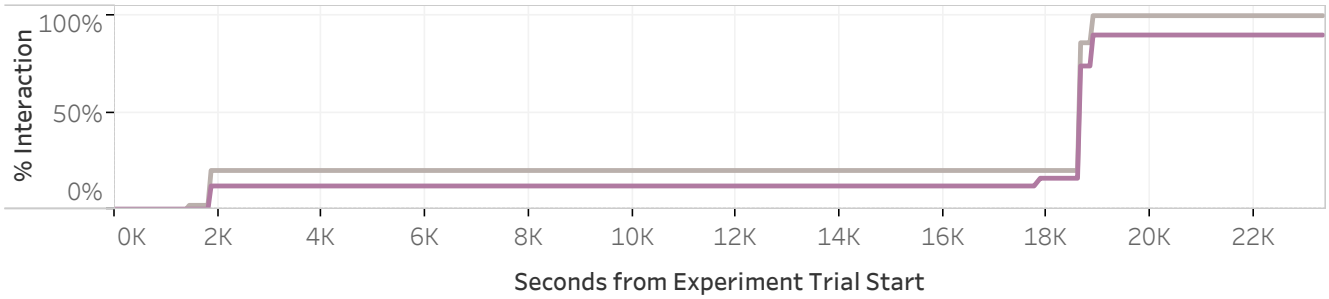
Real & Decoy Packets per Minute

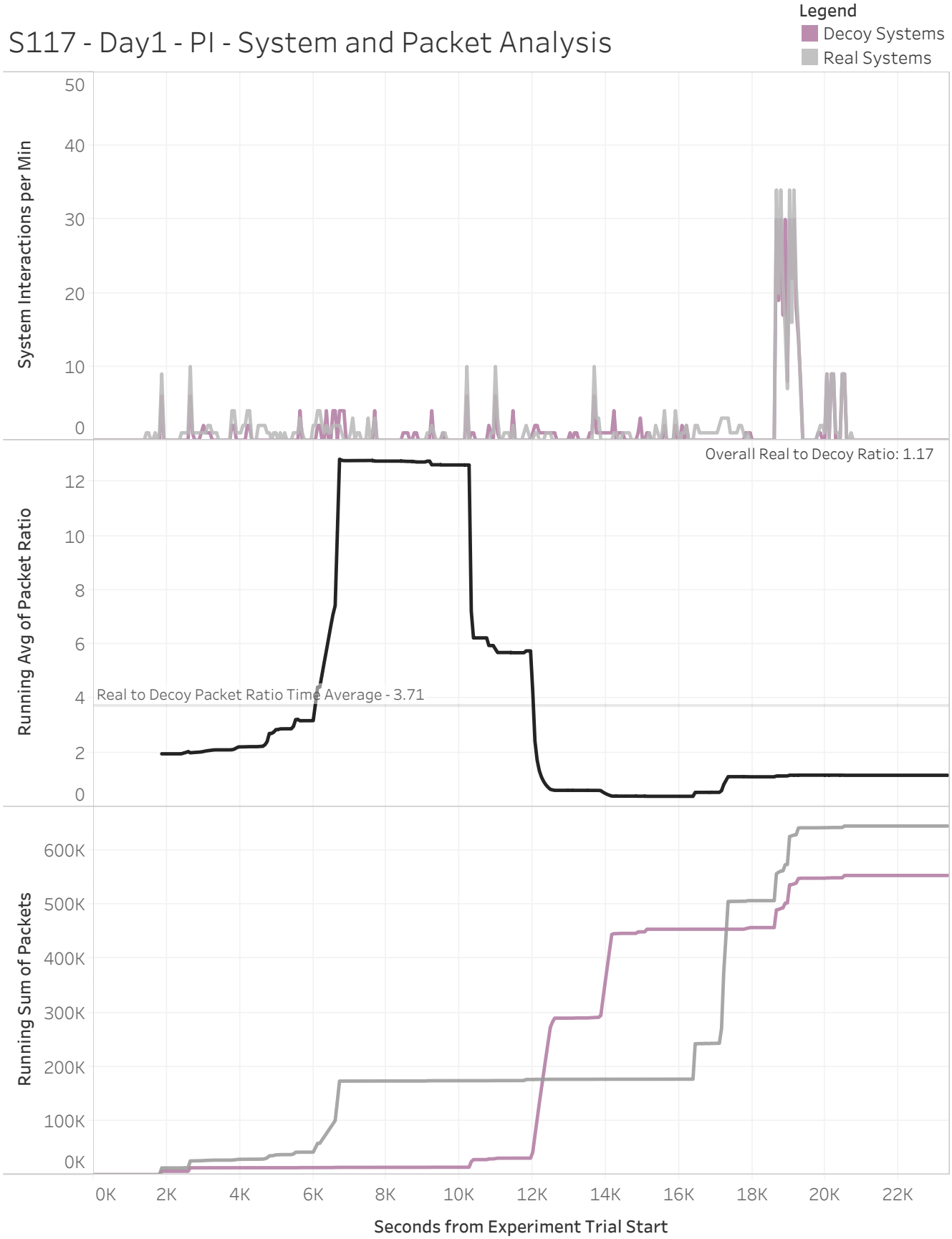


Real to Decoy Packet Ratio



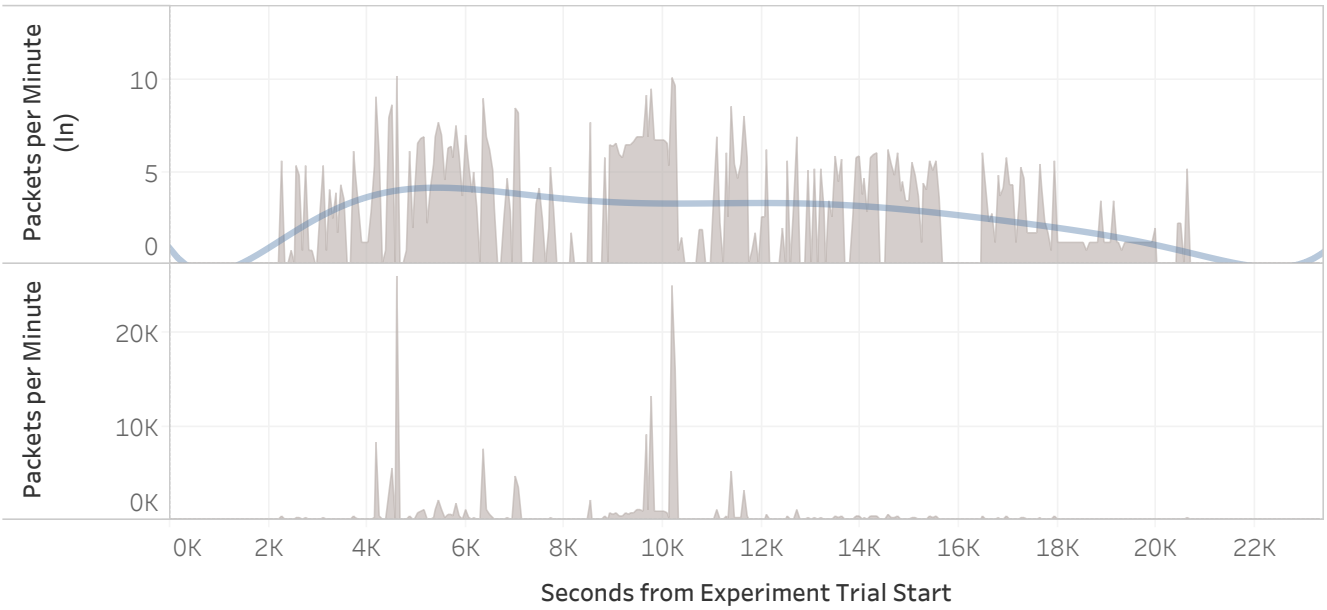
Real & Decoy System Interaction Timeline



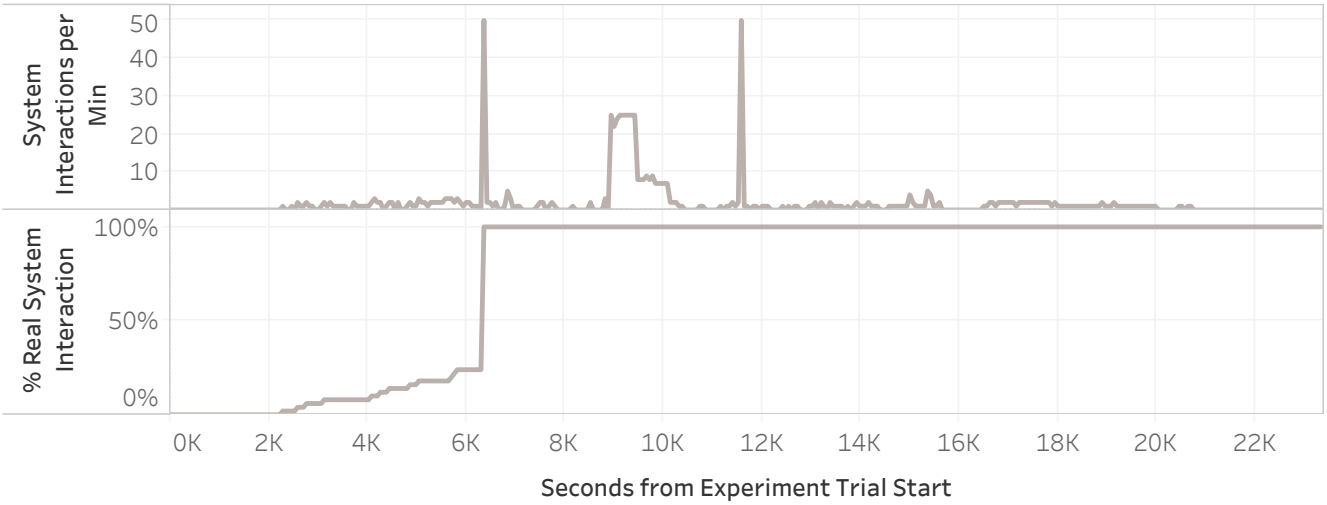

S117 - Day1 - PI - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Overall Real to Decoy Ratio: 1.17
Running Avg of Packet Ratio
12
10
8
6
4
2
0
Real to Decoy Packet Ratio Time Average - 3.71
Running Sum of Packets
600K
500K
400K
300K
200K
100K
0K
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

S118 - Day 1 - AI

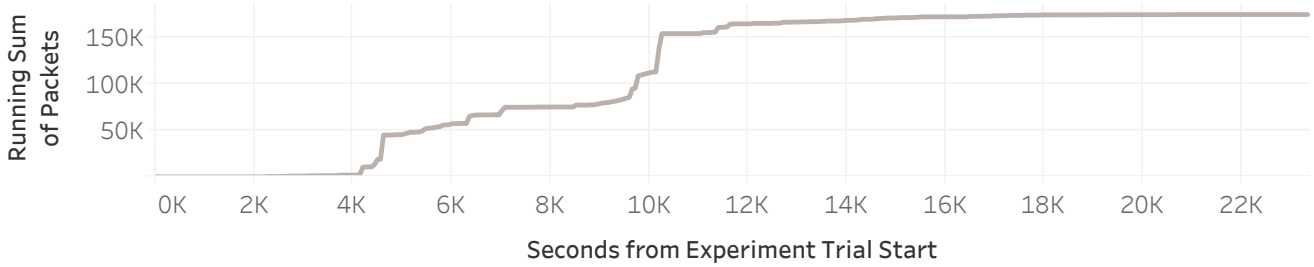
Real Packets per Minute



Real System Interaction Timeline

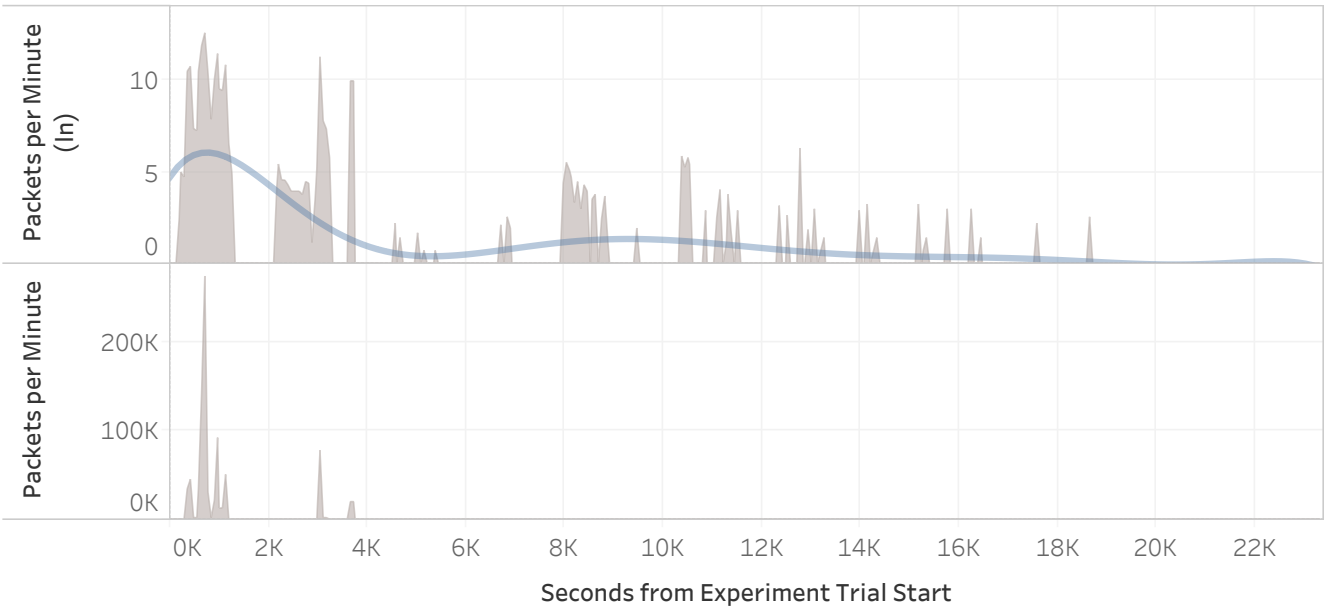


Running Sum of Packets

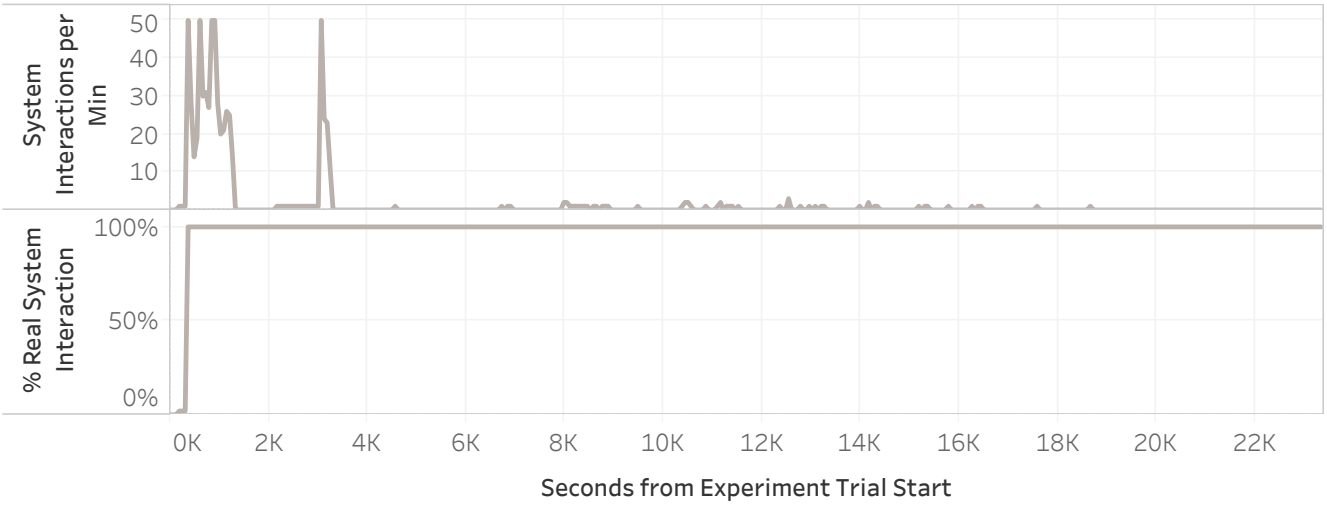


S119 - Day 1 - AI

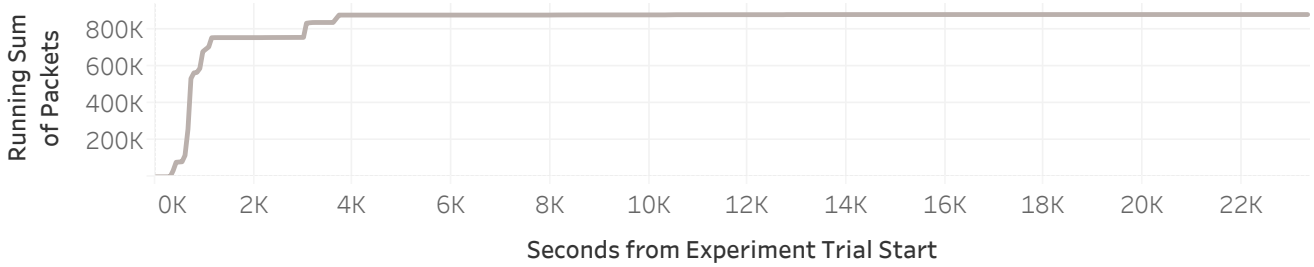
Real Packets per Minute



Real System Interaction Timeline

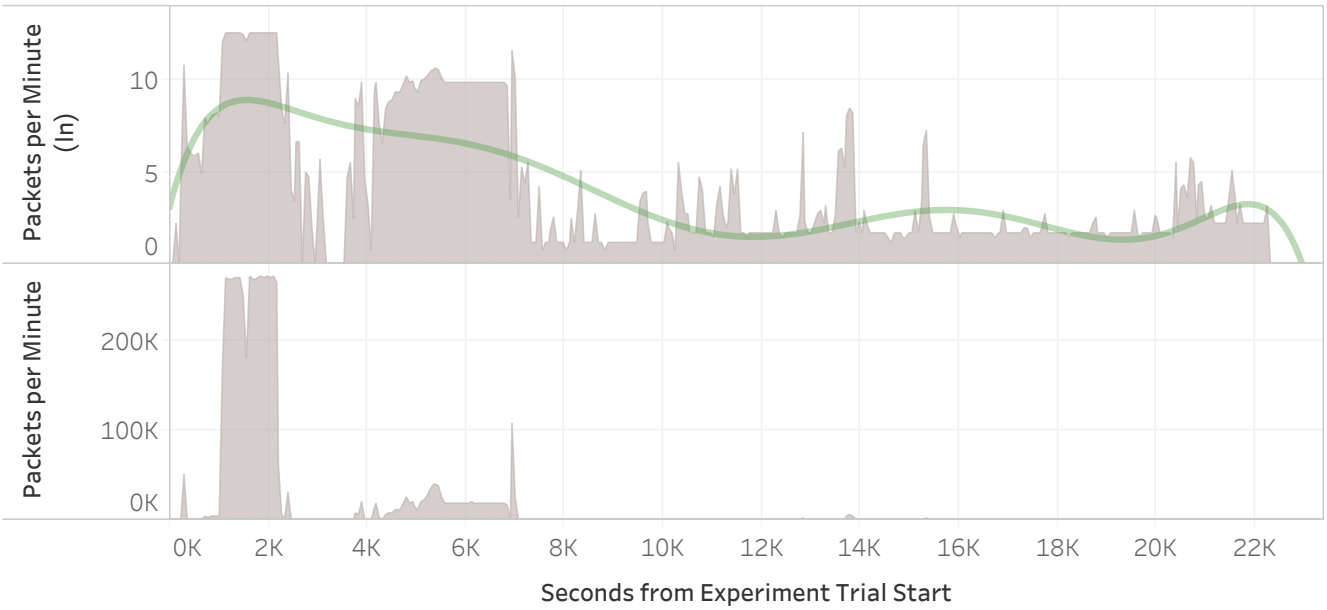


Running Sum of Packets

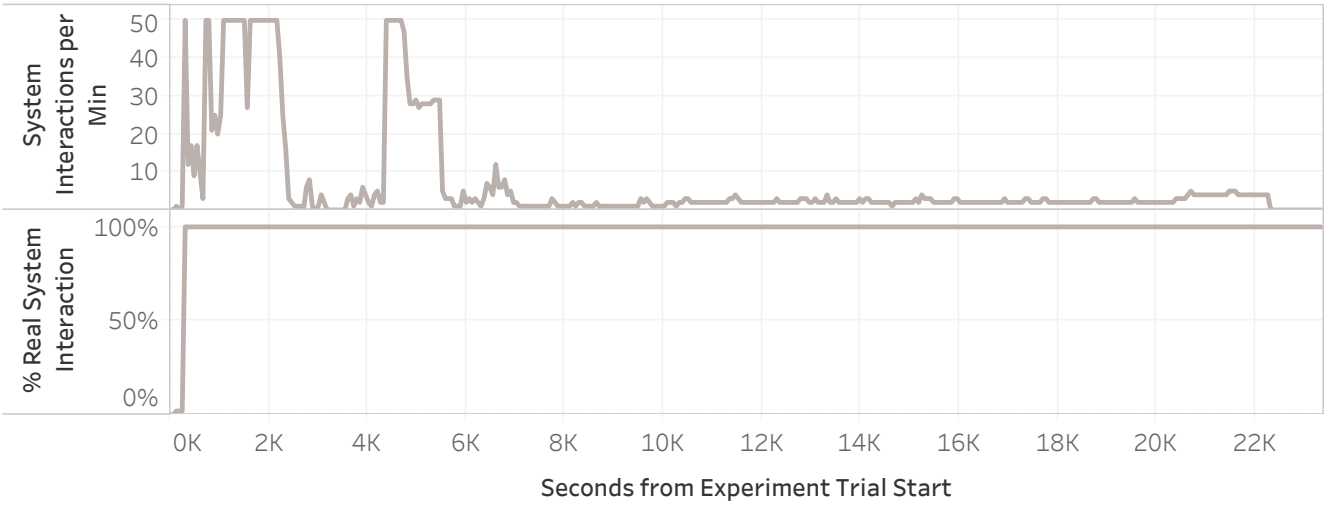


S120 - Day 1 - AU

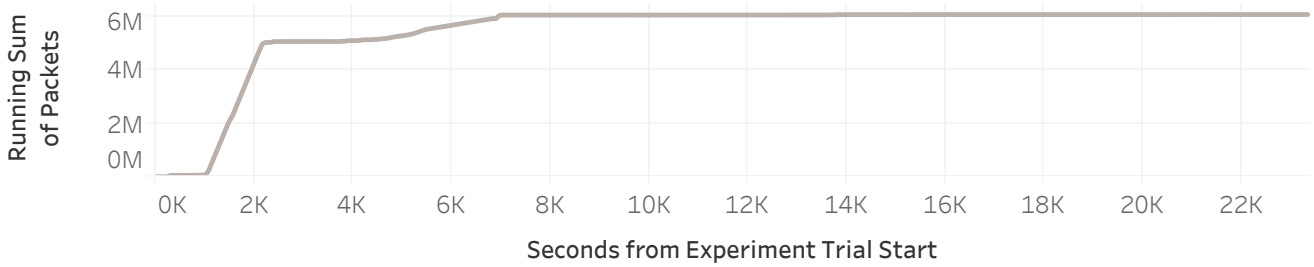
Real Packets per Minute



Real System Interaction Timeline

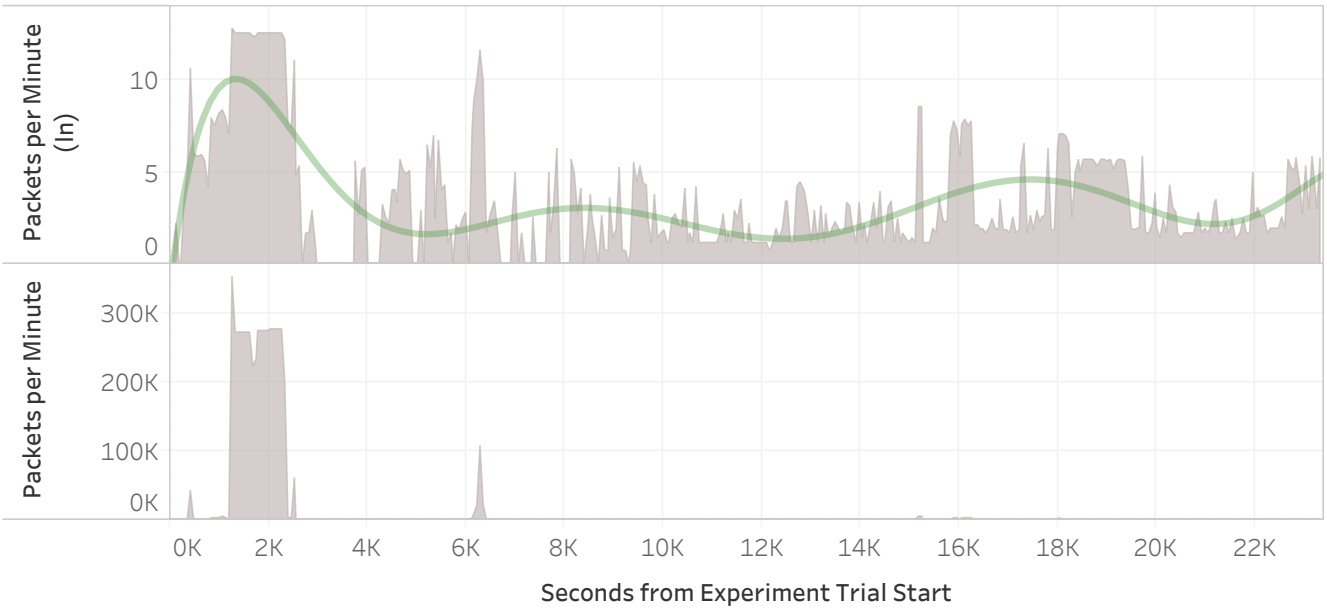


Running Sum of Packets

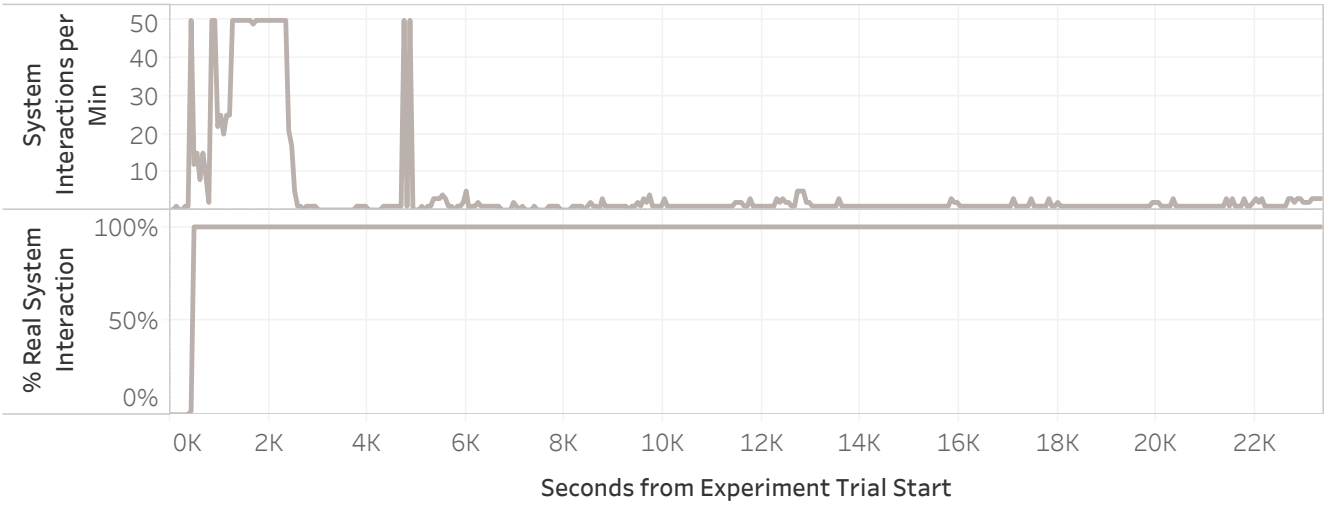


S121 - Day 1 - AU

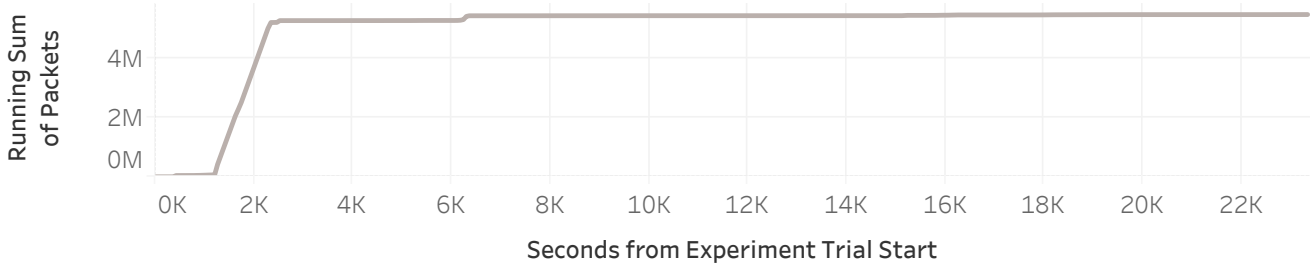
Real Packets per Minute



Real System Interaction Timeline

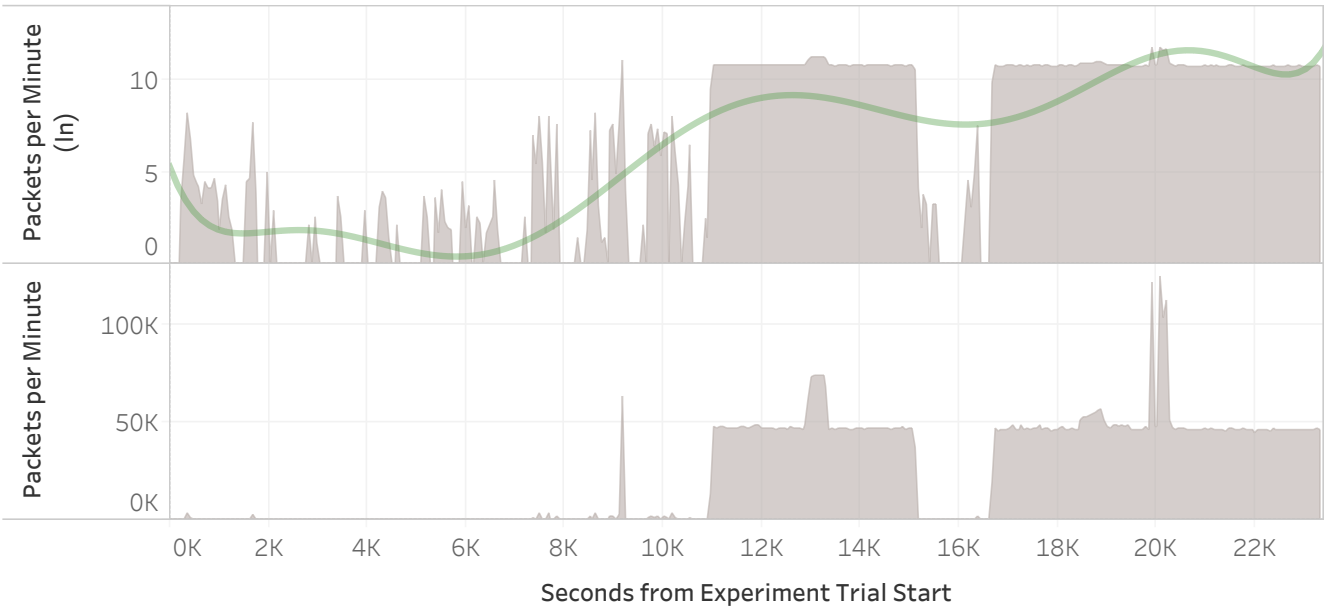


Running Sum of Packets

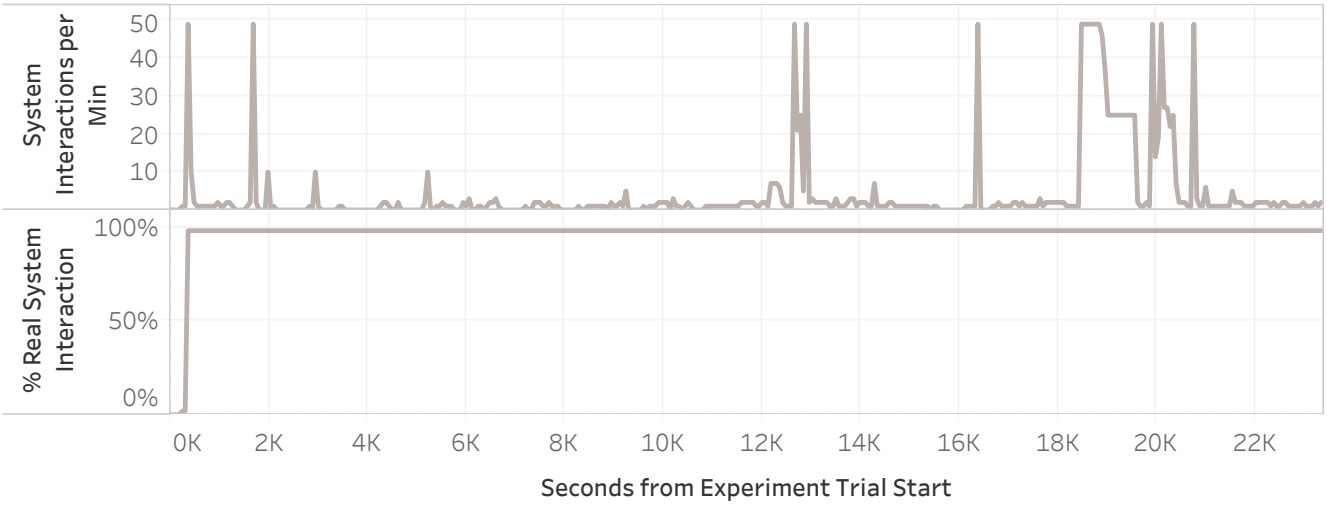


S122 - Day 1 - AU

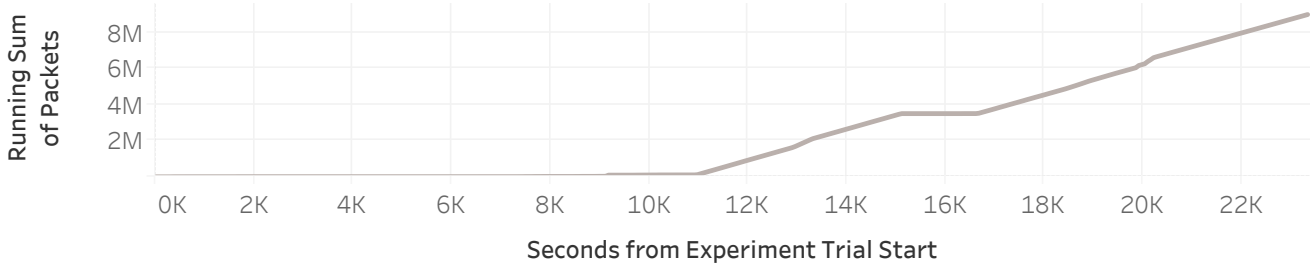
Real Packets per Minute



Real System Interaction Timeline



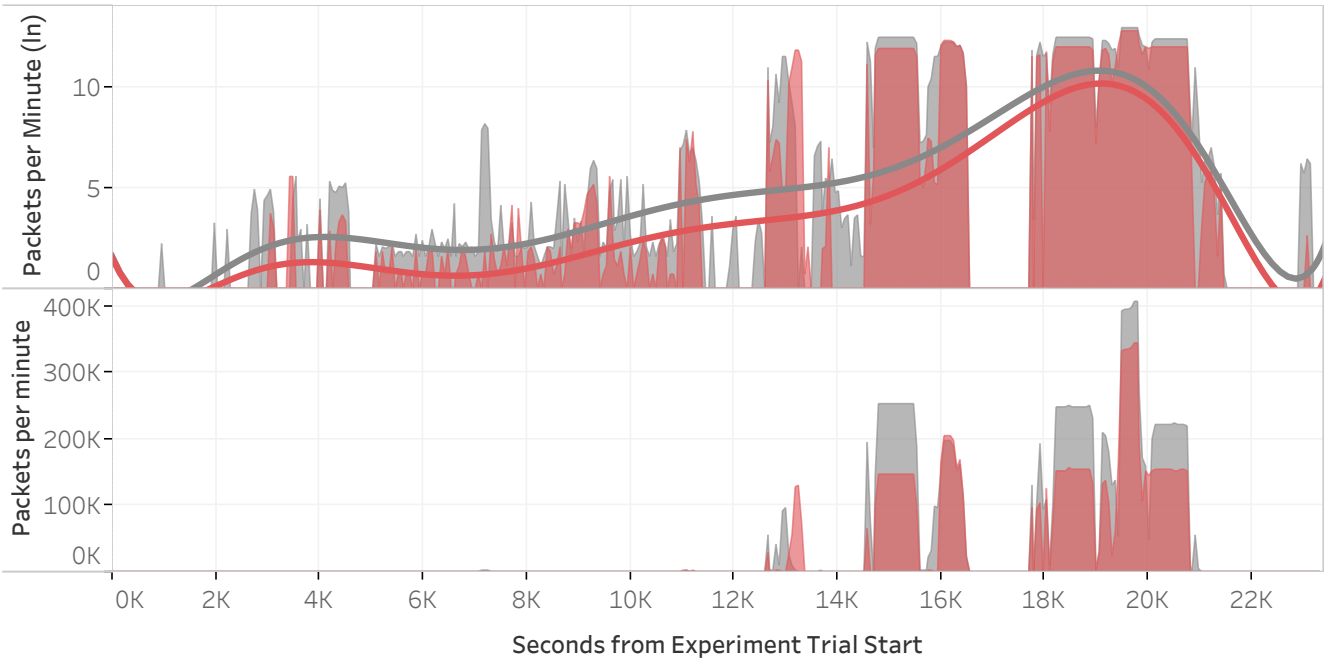
Running Sum of Packets



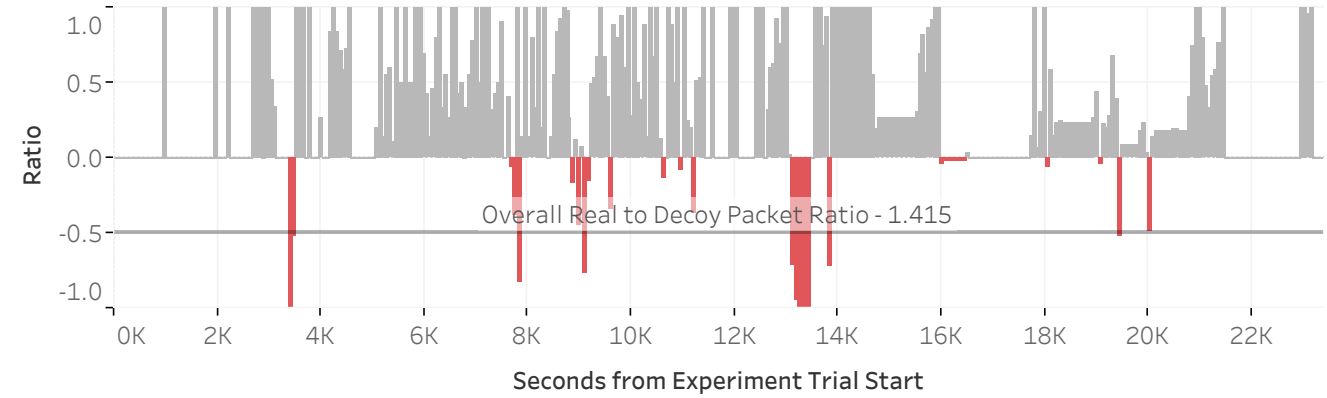
S123 - Day1 - PU

Legend
Real Systems
Decoy Systems

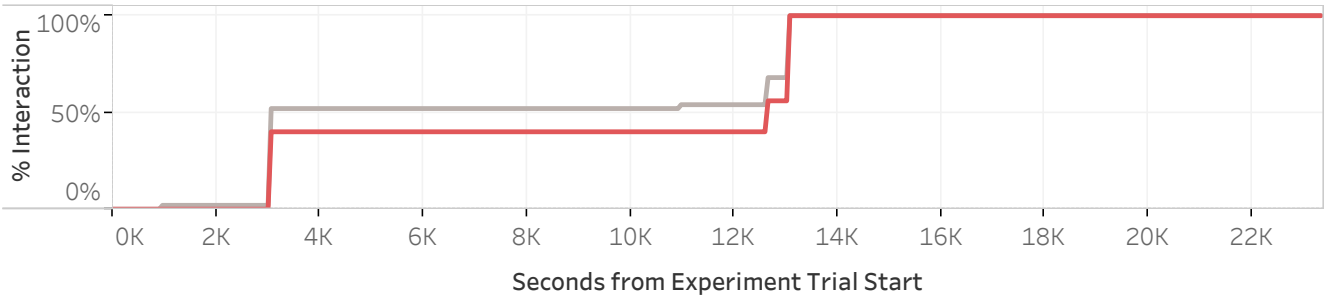
Real & Decoy Packets per Minute

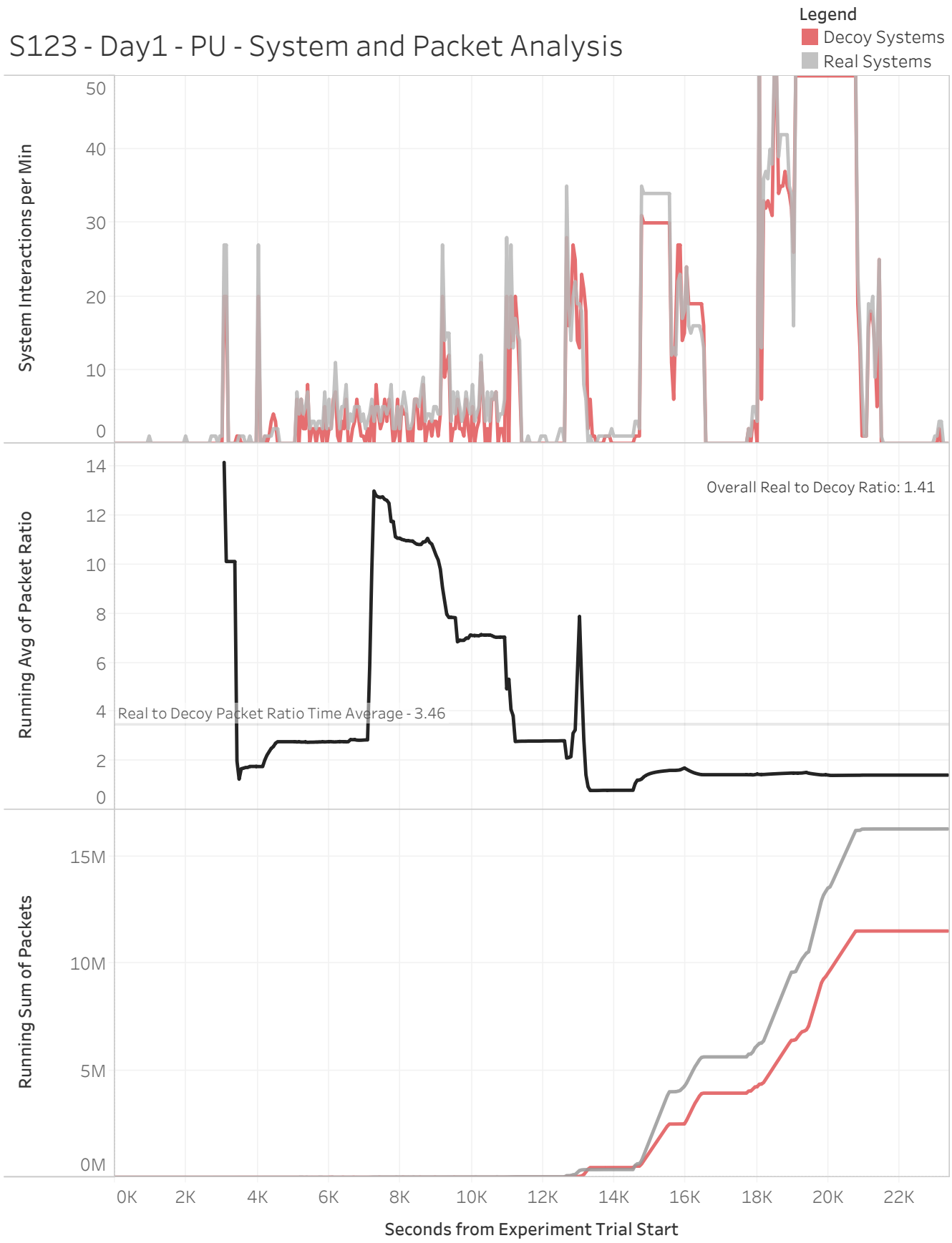


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

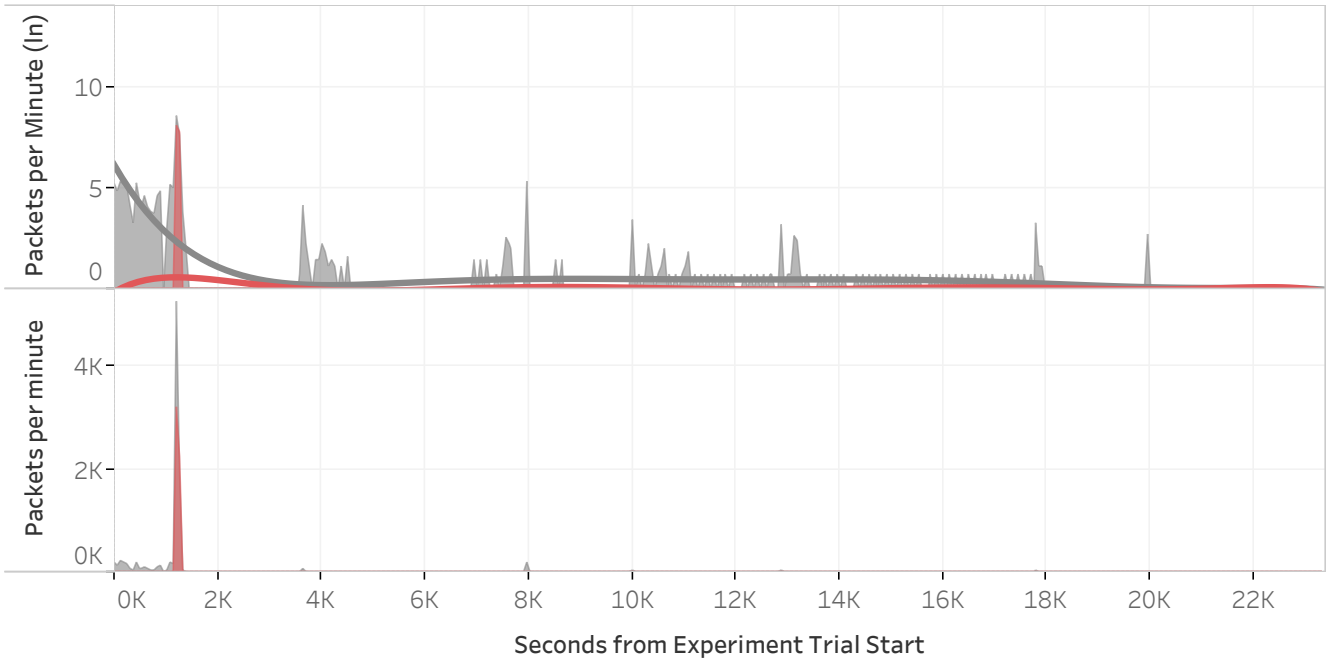



S123 - Day1 - PU - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
14
12
10
8
6
4
2
0
Overall Real to Decoy Ratio: 1.41
Real to Decoy Packet Ratio Time Average - 3.46
Running Sum of Packets
15M
10M
5M
0M
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

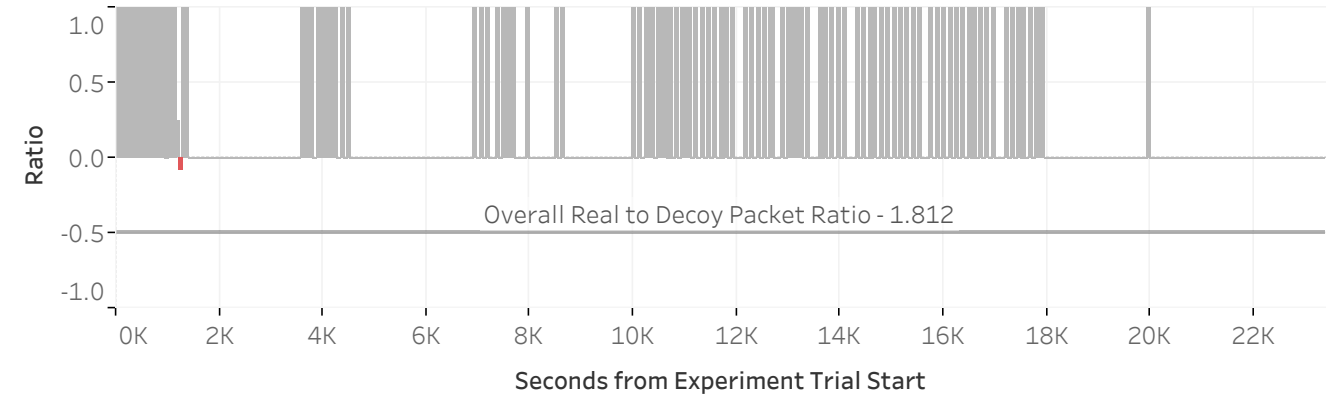
S124 - Day1 - PU

Legend
Real Systems
Decoy Systems

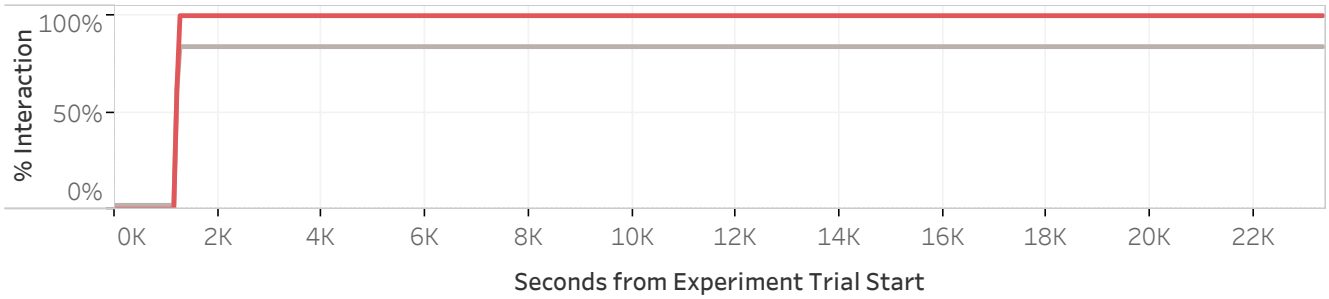
Real & Decoy Packets per Minute

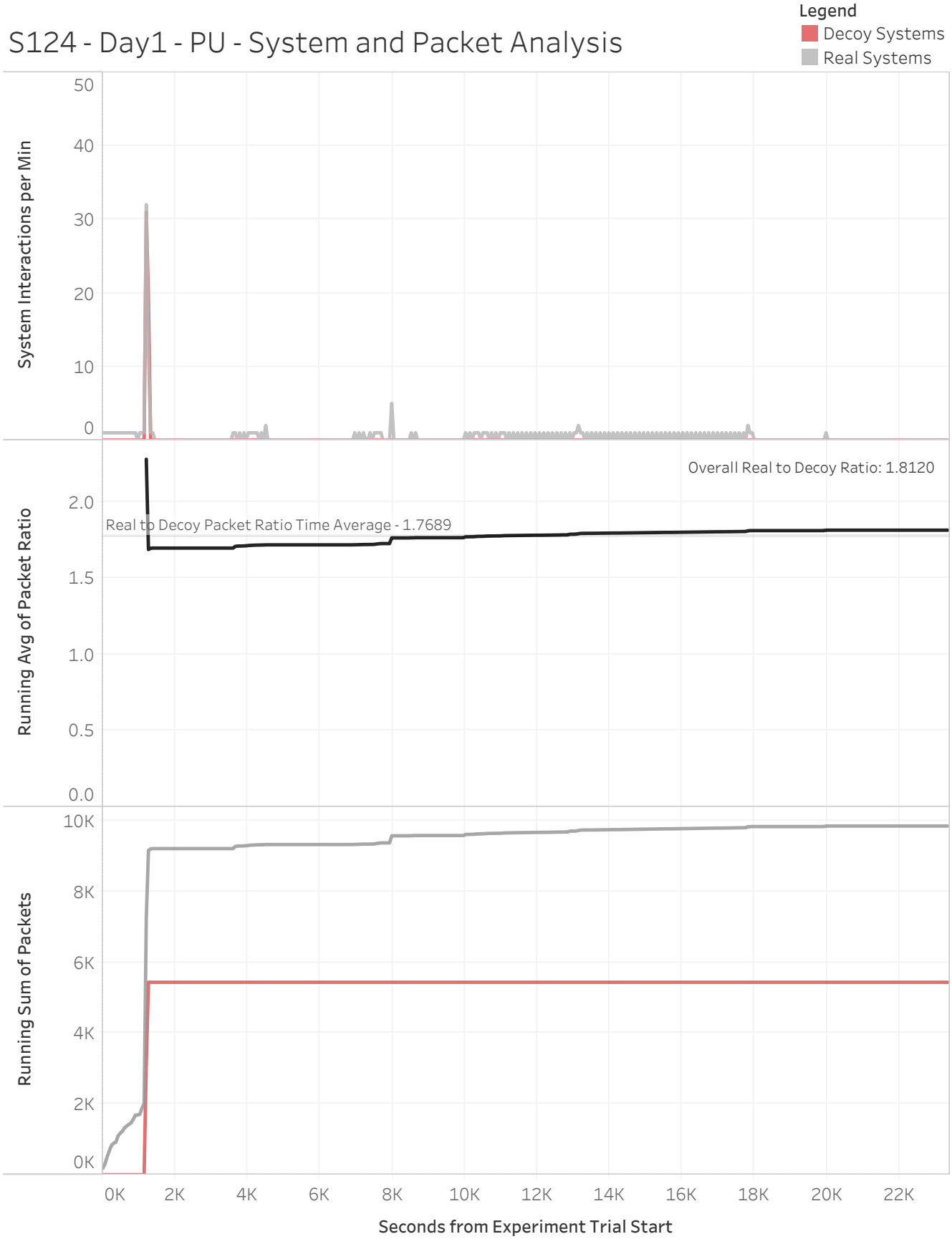


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

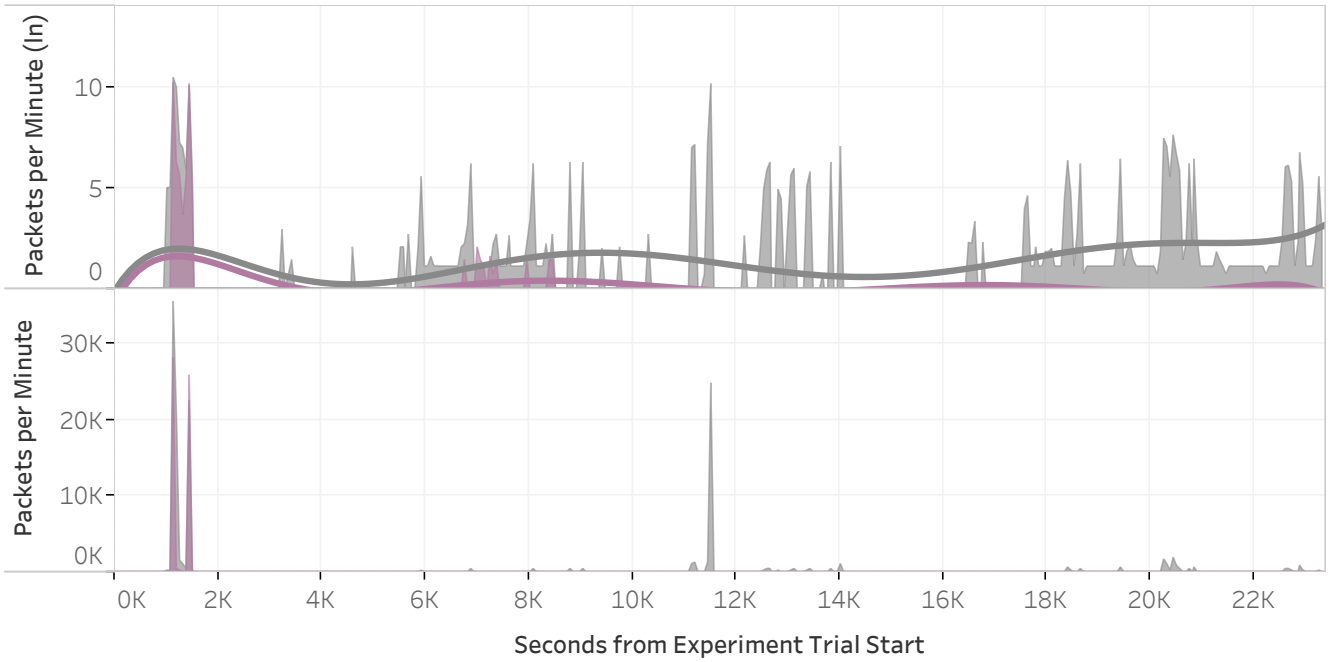



S124 - Day1 - PU - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
Overall Real to Decoy Ratio: 1.8120
Real to Decoy Packet Ratio Time Average - 1.7689
2.0
1.5
1.0
0.5
0.0
Running Sum of Packets
10K
8K
6K
4K
2K
0K
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

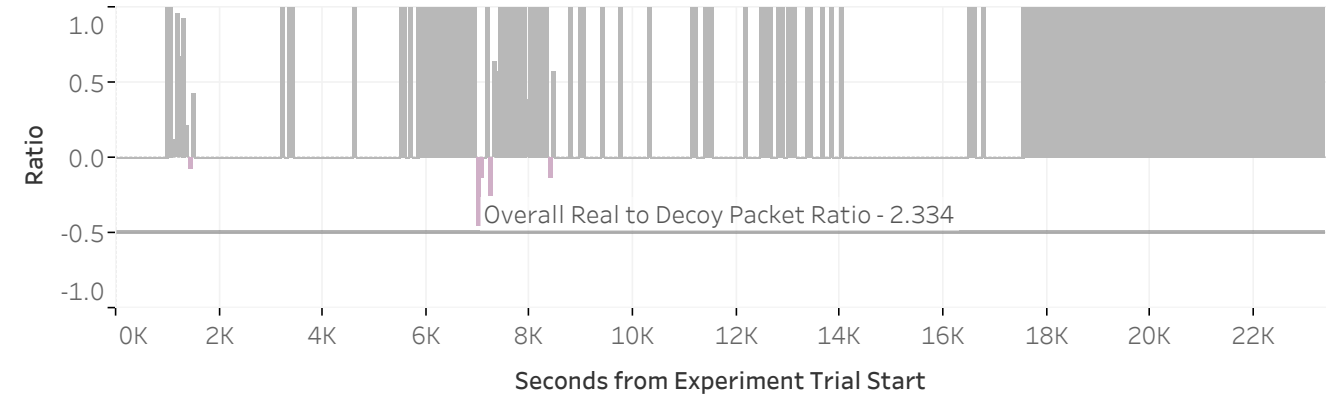
S125 - Day1 - PI

Legend
Real Systems
Decoy Systems

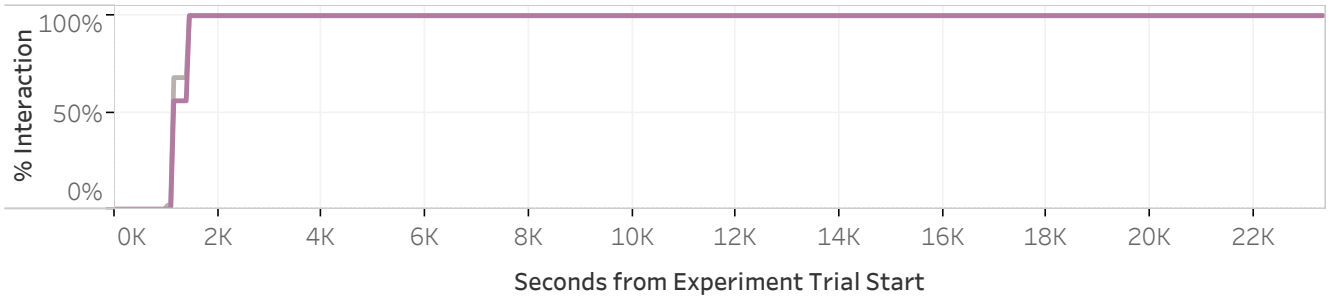
Real & Decoy Packets per Minute

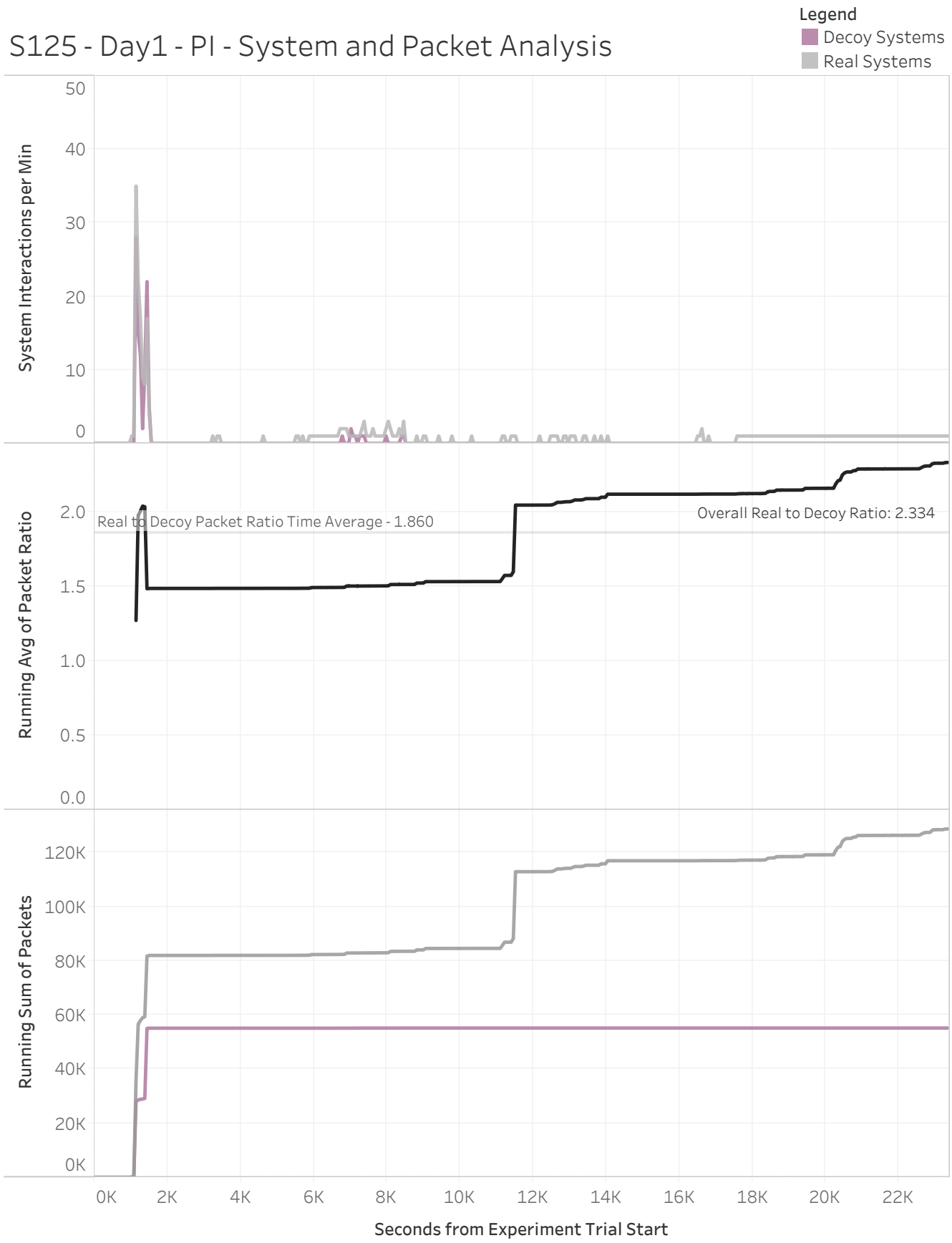


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

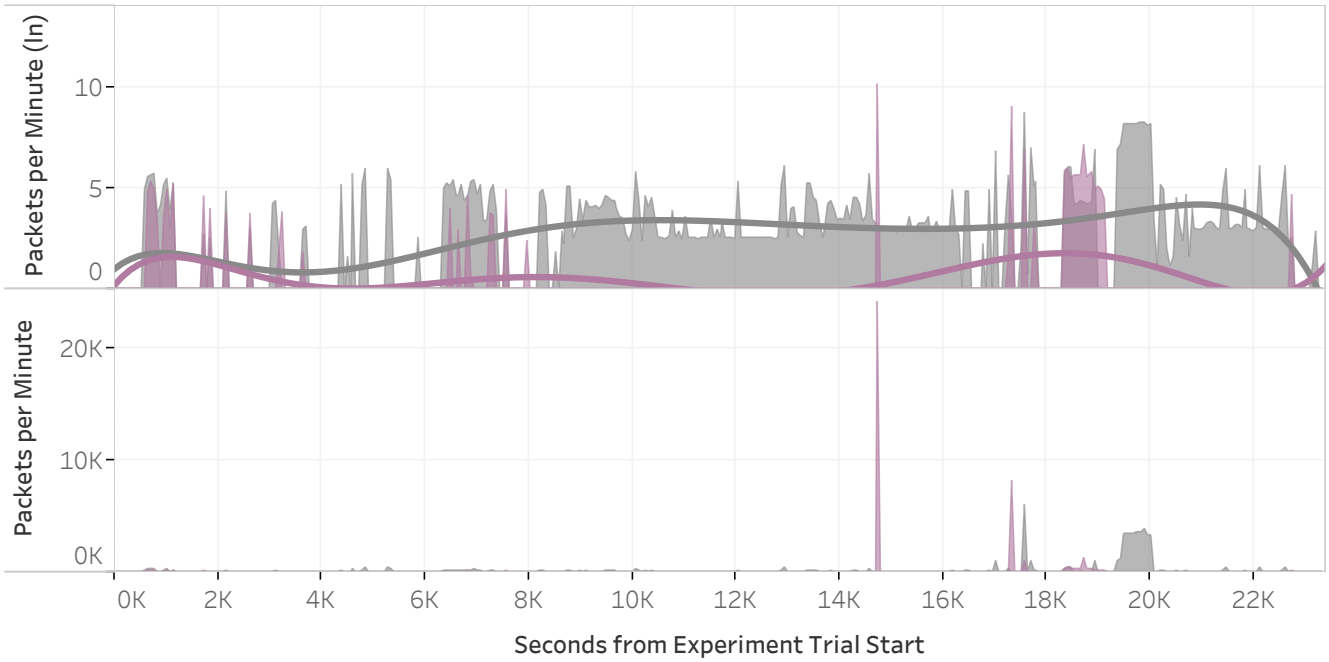



S125 - Day1 - PI - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
2.0
1.5
1.0
0.5
0.0
Real to Decoy Packet Ratio Time Average - 1.860
Overall Real to Decoy Ratio: 2.334
Running Sum of Packets
120K
100K
80K
60K
40K
20K
0K
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

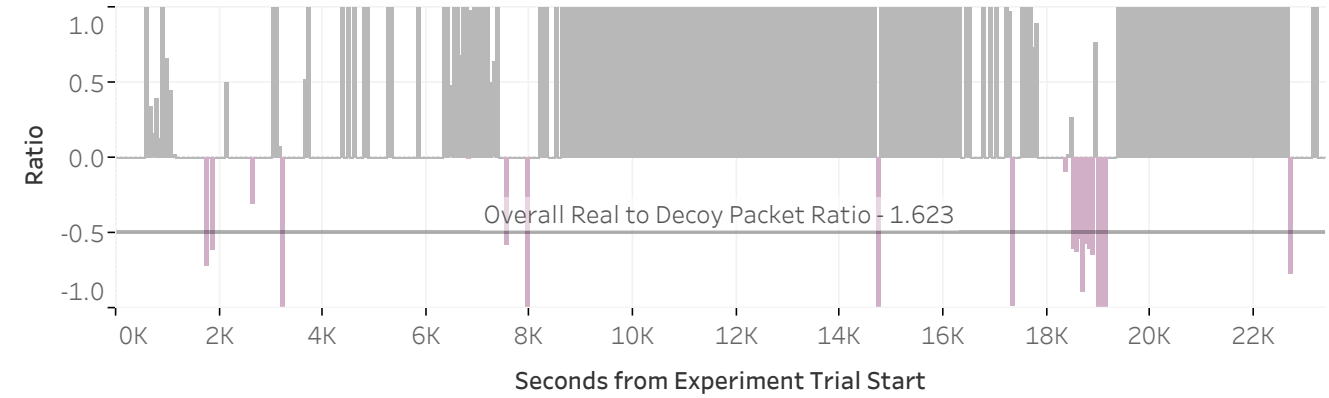
S126 - Day1 - PI

Legend
Real Systems
Decoy Systems

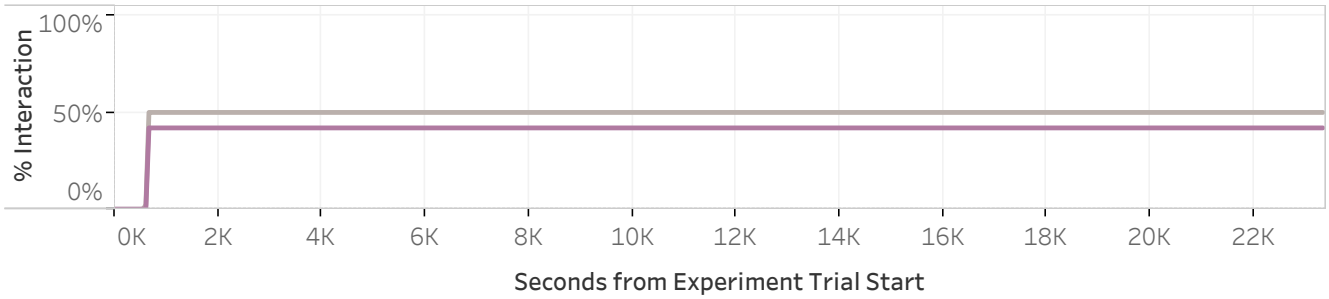
Real & Decoy Packets per Minute

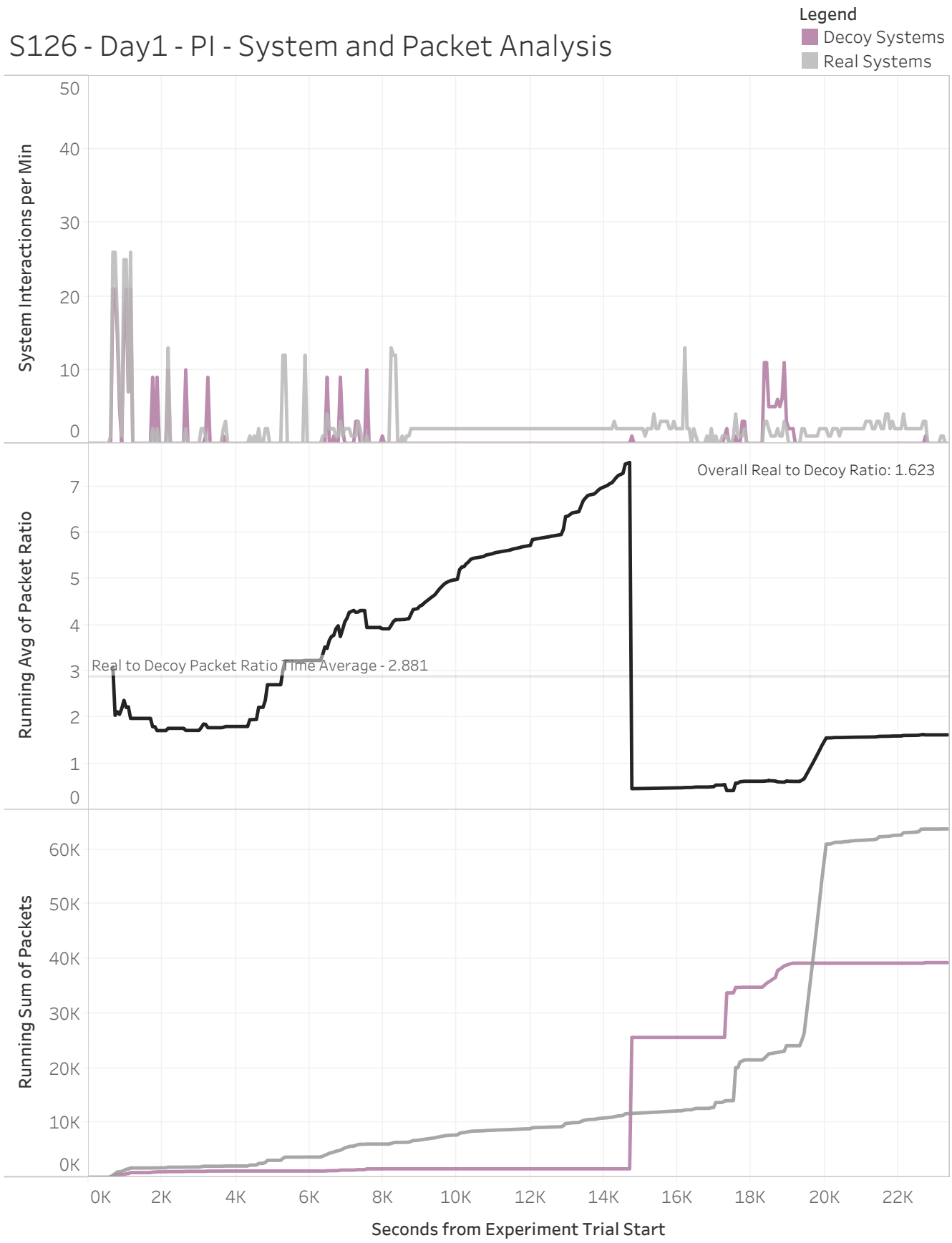


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

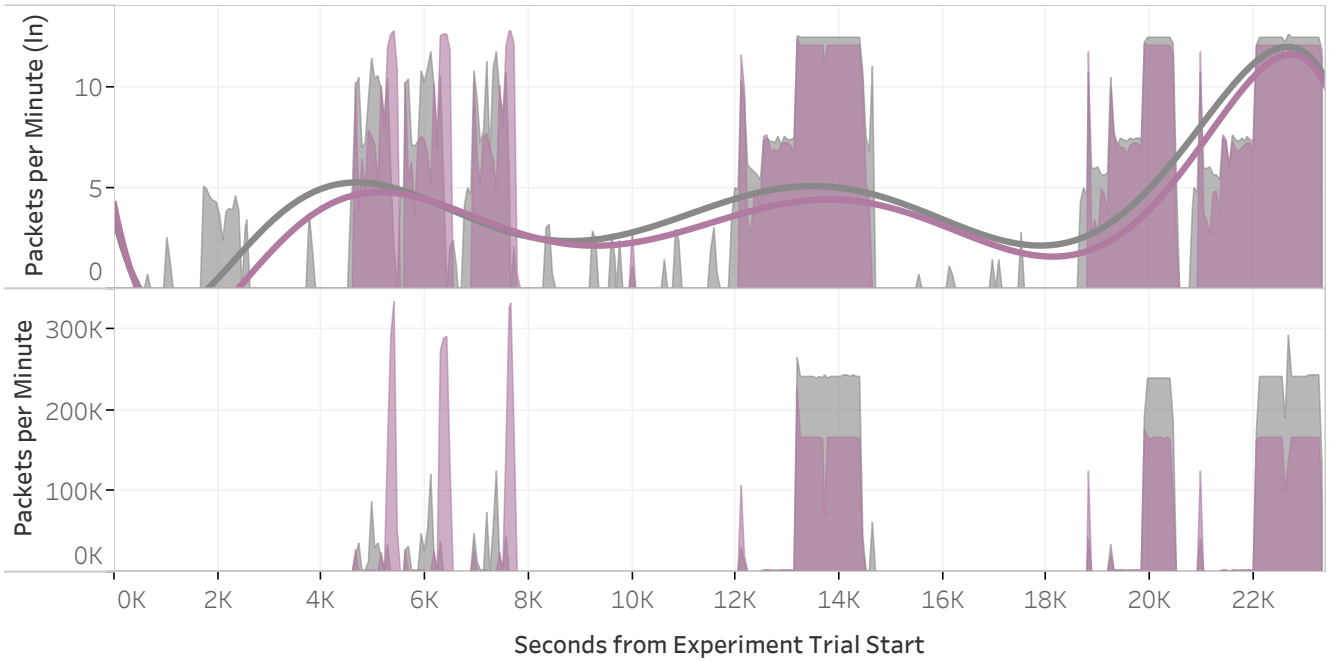



S126 - Day1 - PI - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
7
6
5
4
3
2
1
0
Overall Real to Decoy Ratio: 1.623
Real to Decoy Packet Ratio Time Average - 2.881
Running Sum of Packets
60K
50K
40K
30K
20K
10K
0K
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

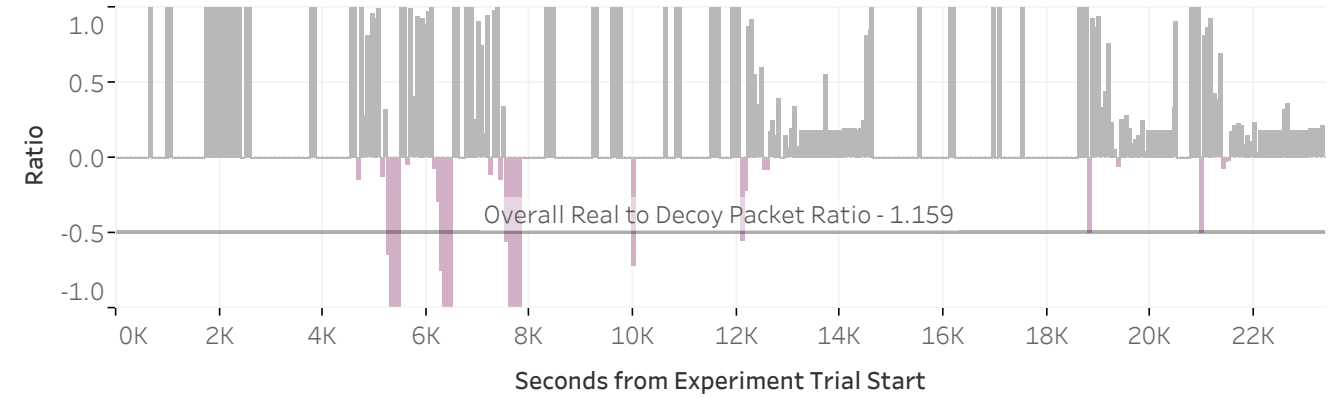
S127 - Day1 - PI

Legend
Real Systems
Decoy Systems

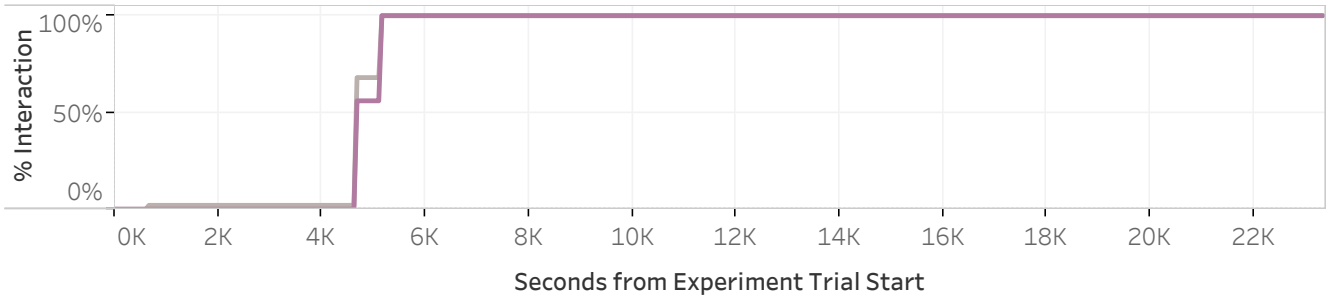
Real & Decoy Packets per Minute

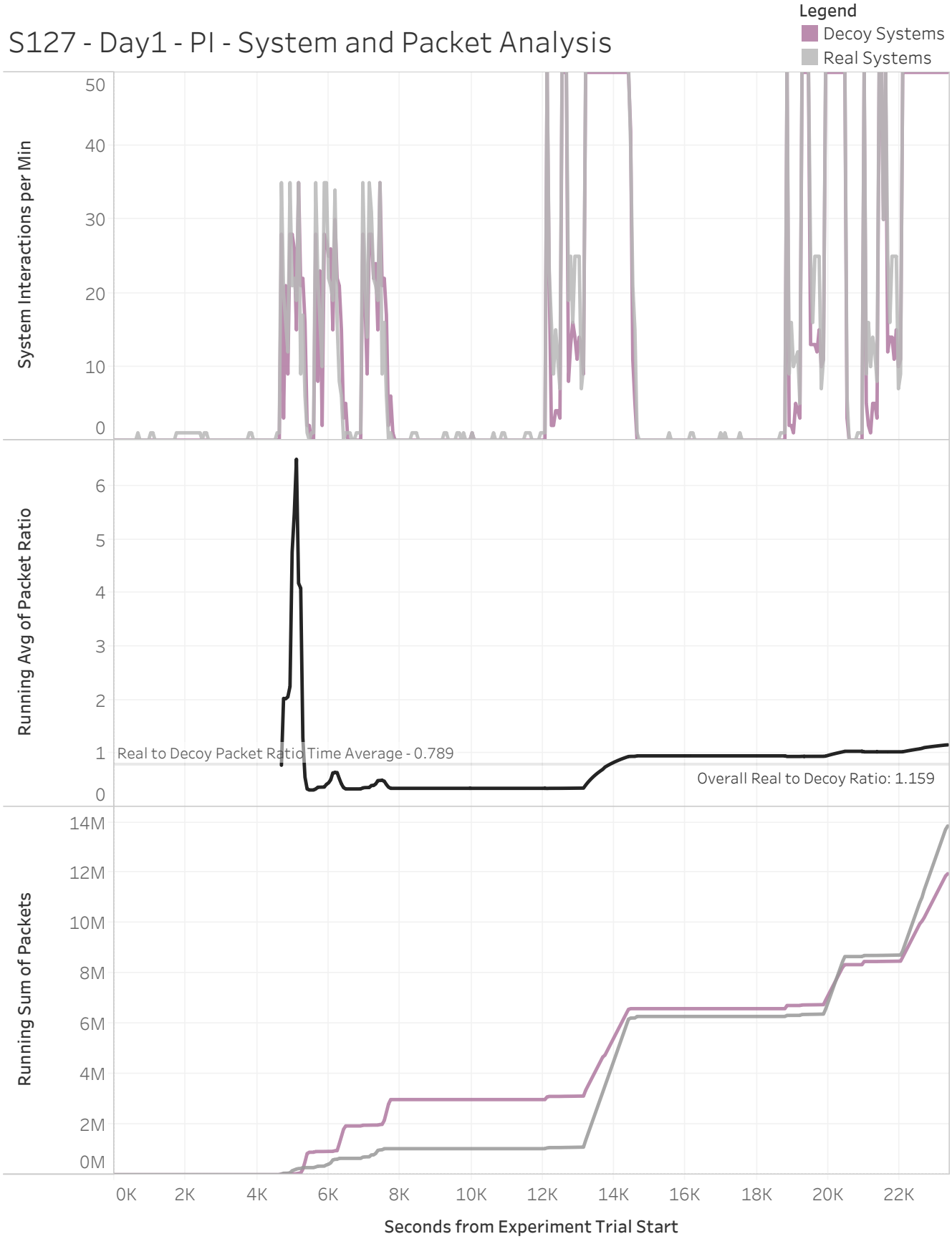


Real to Decoy Packet Ratio



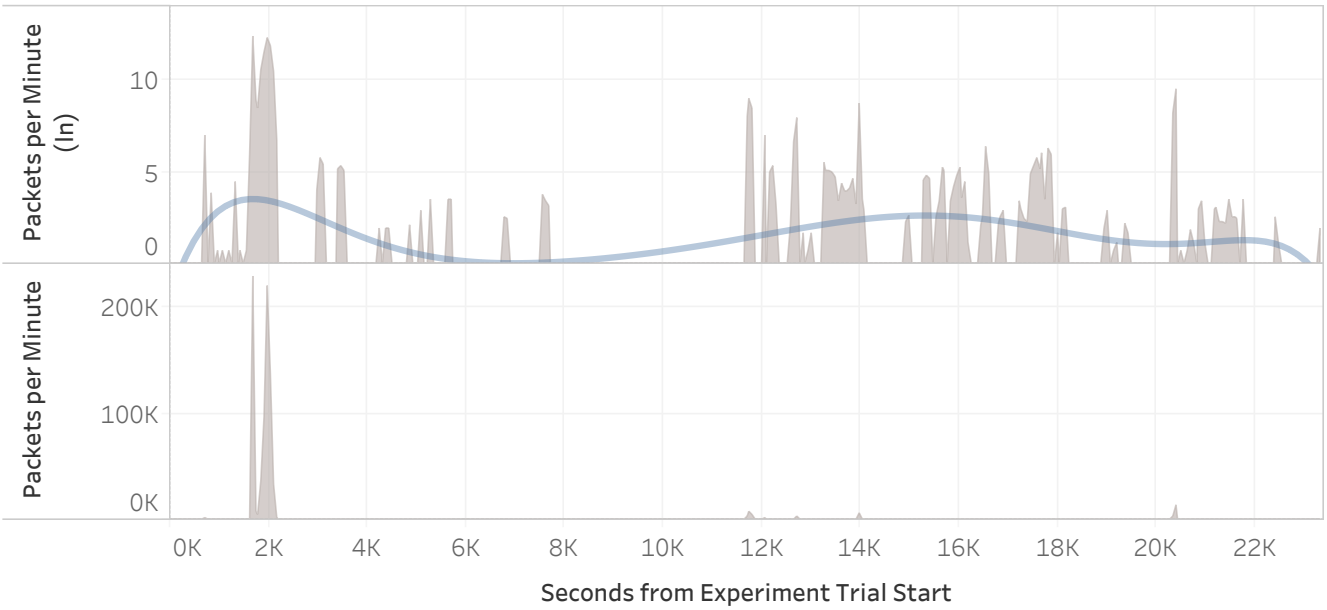
Real & Decoy System Interaction Timeline



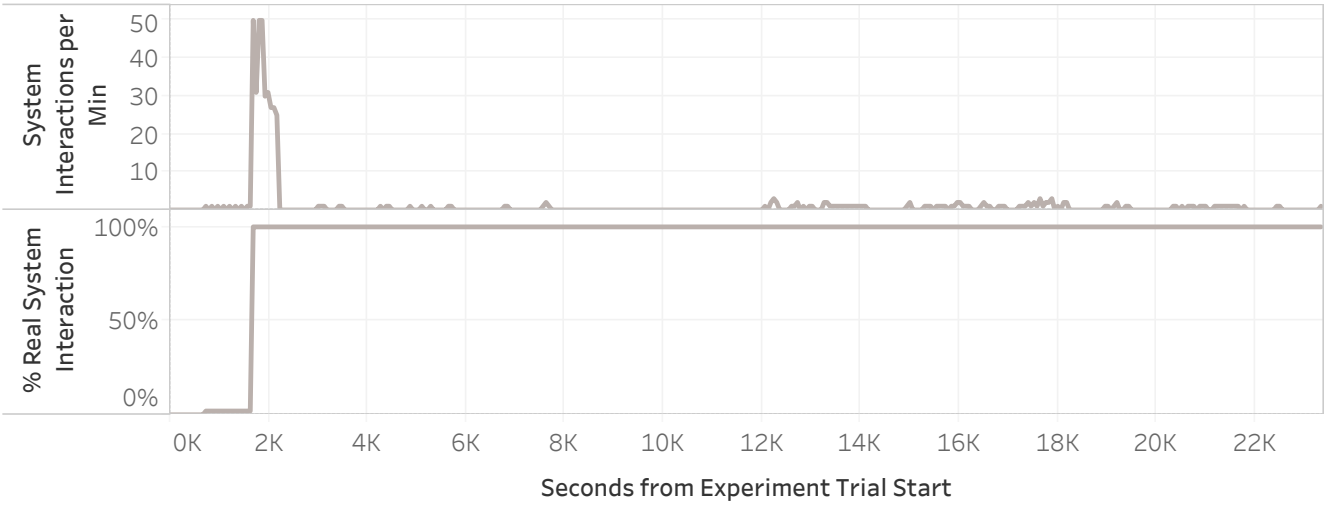

S127 - Day1 - PI - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
6
5
4
3
2
1
0
Real to Decoy Packet Ratio Time Average - 0.789
Overall Real to Decoy Ratio: 1.159
Running Sum of Packets
14M
12M
10M
8M
6M
4M
2M
0M
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

S128 - Day 1 - AI

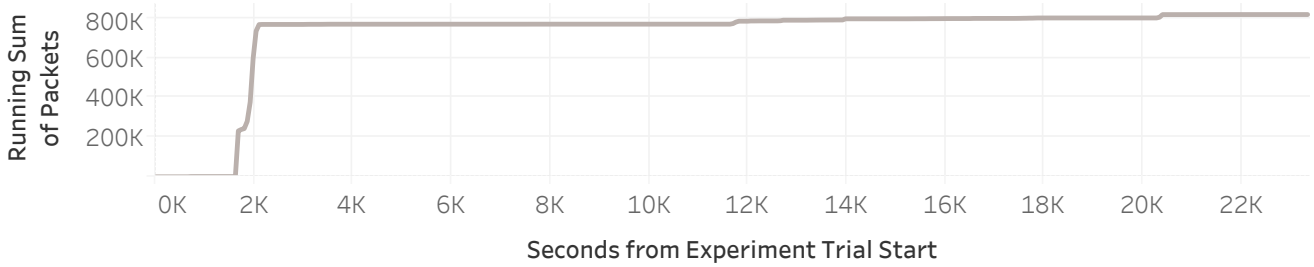
Real Packets per Minute



Real System Interaction Timeline

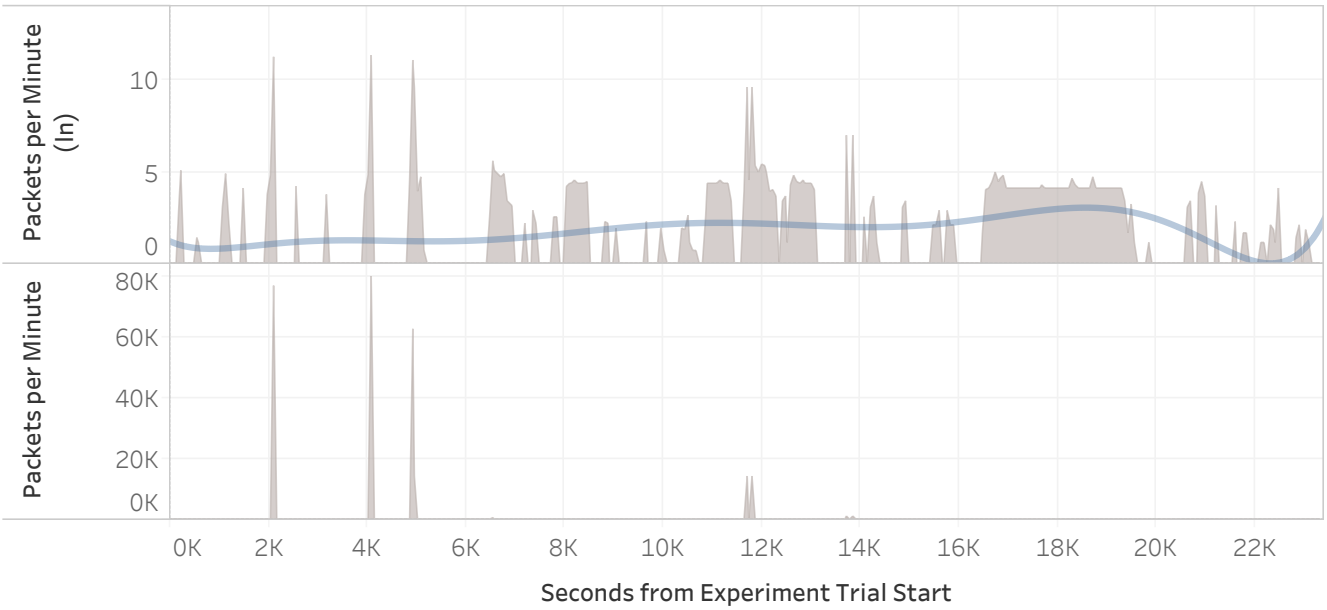


Running Sum of Packets

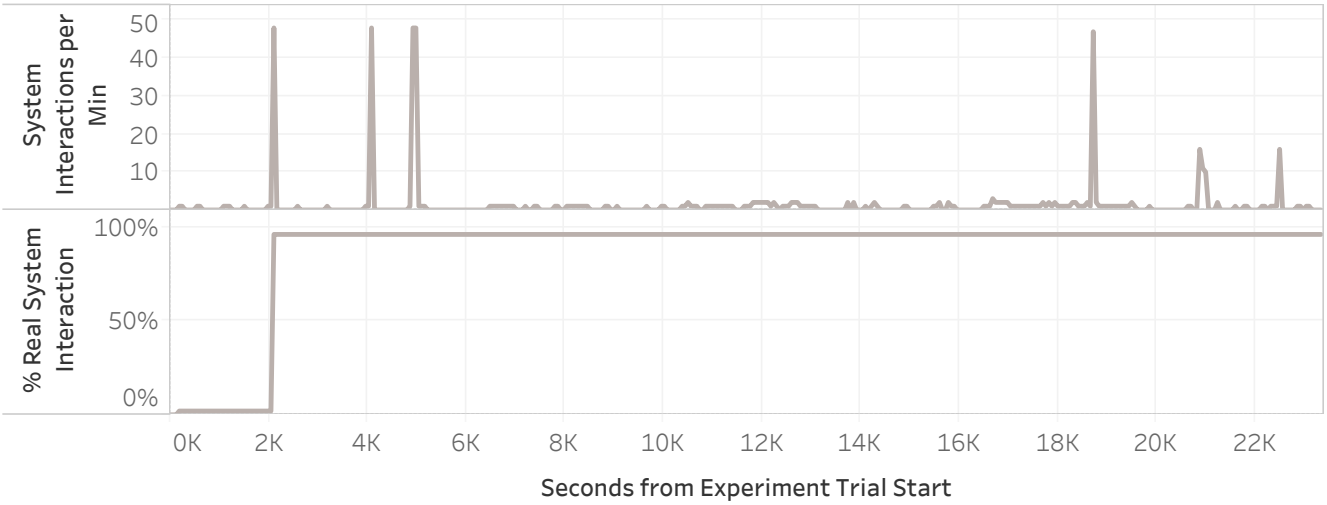


S129 - Day 1 - AI

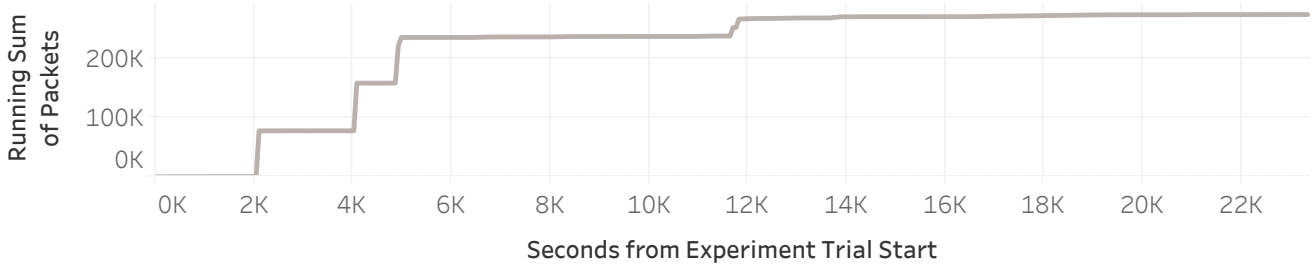
Real Packets per Minute



Real System Interaction Timeline

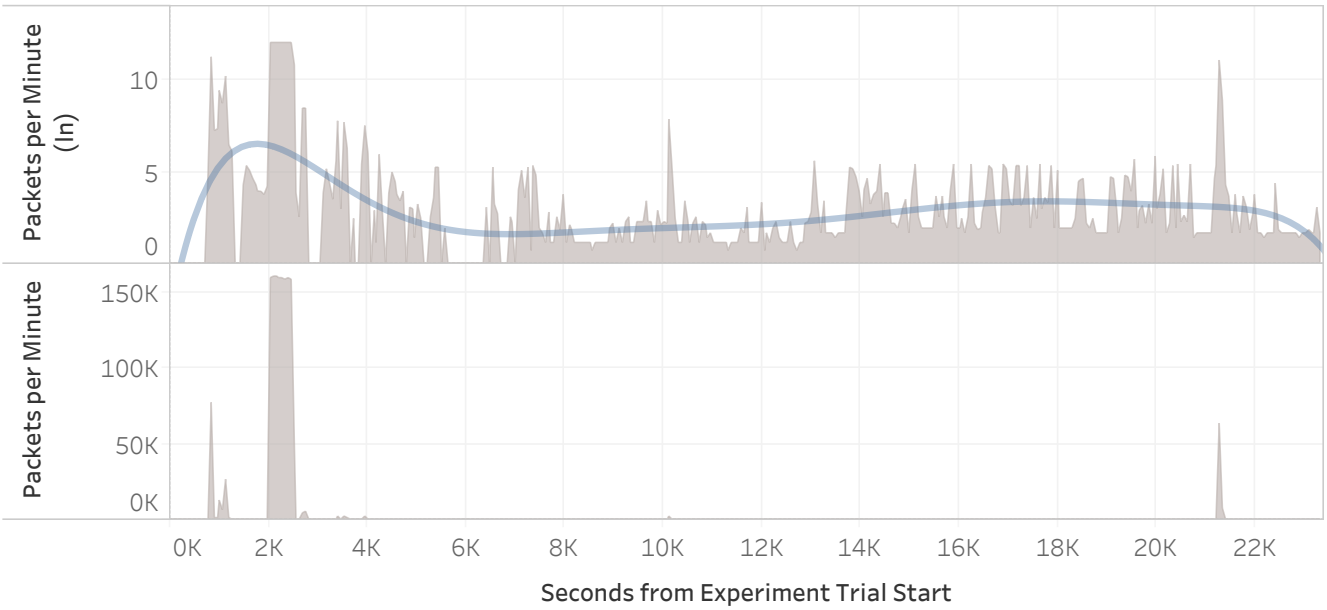


Running Sum of Packets

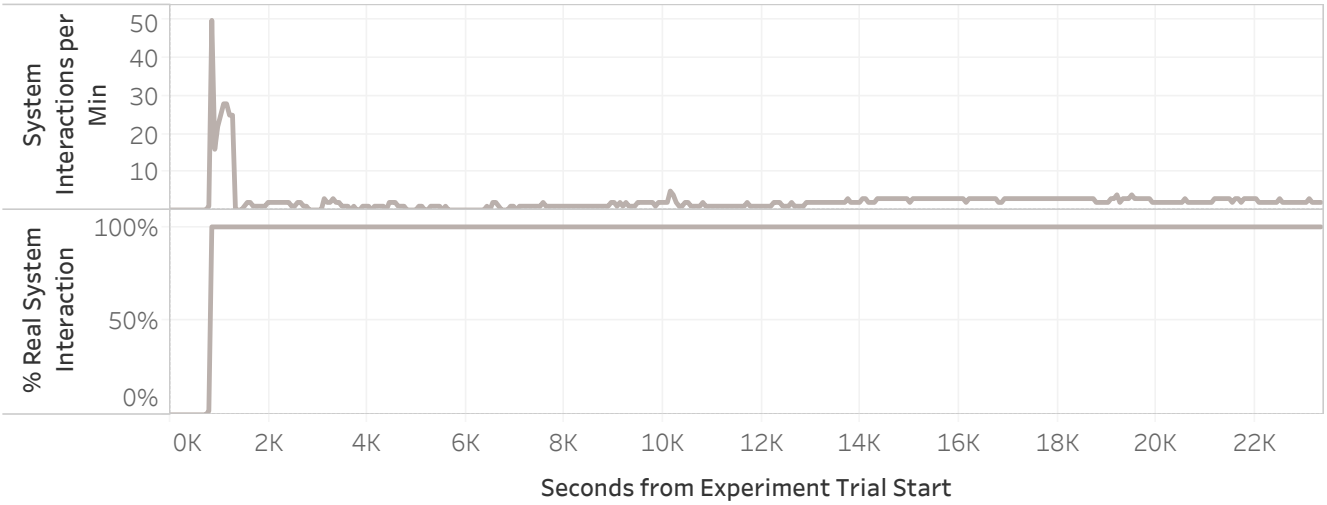


S130 - Day 1 - AI

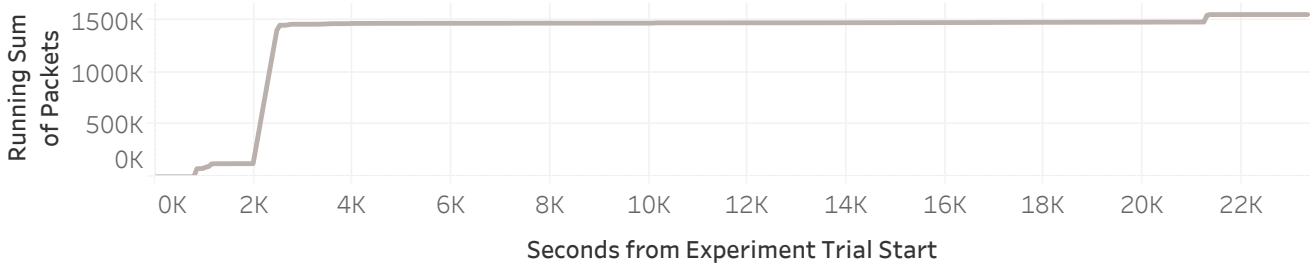
Real Packets per Minute



Real System Interaction Timeline

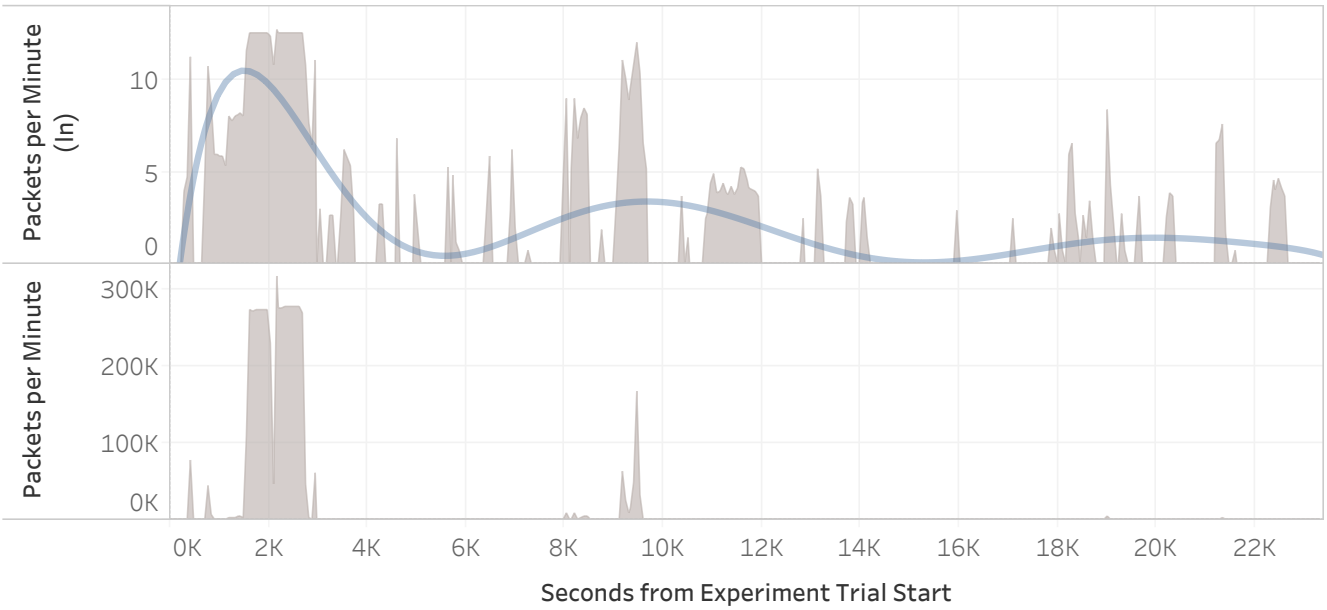


Running Sum of Packets

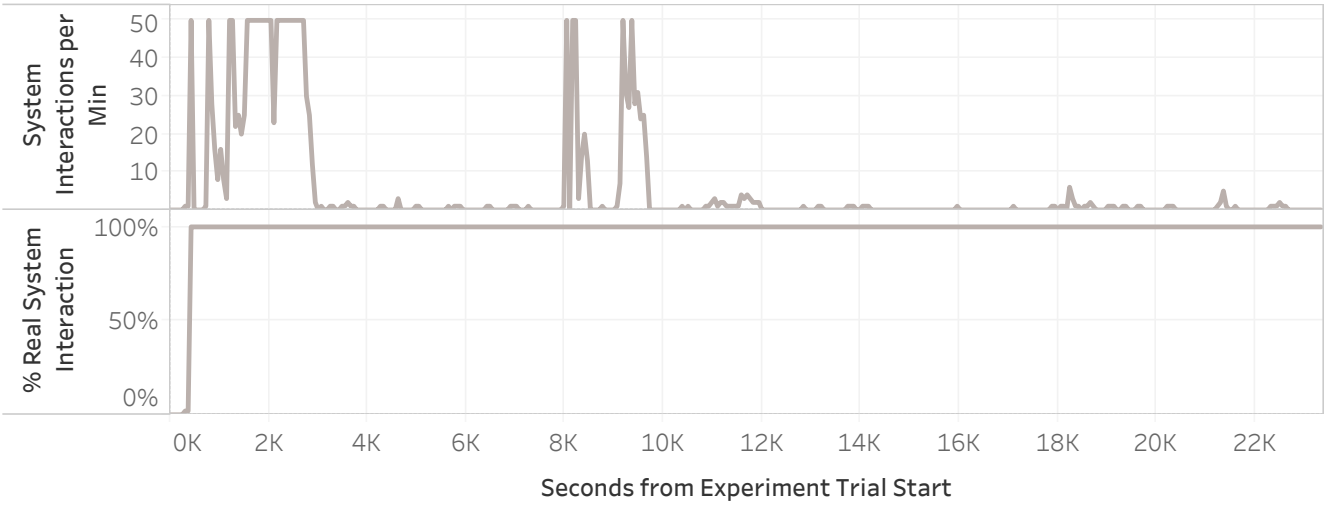


S131 - Day 1 - AI

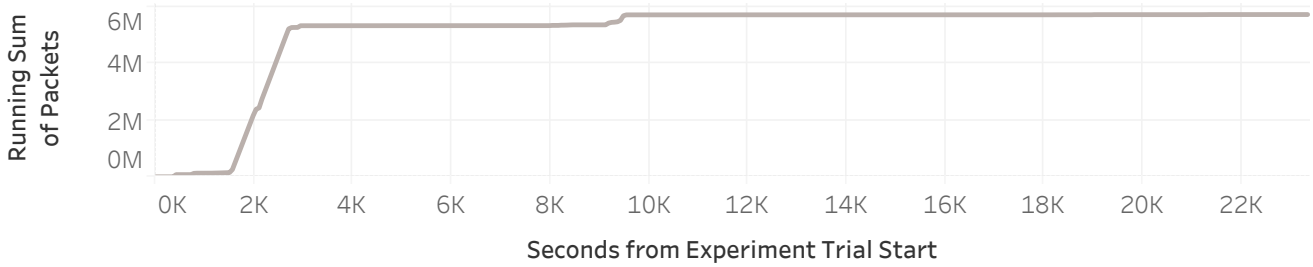
Real Packets per Minute



Real System Interaction Timeline



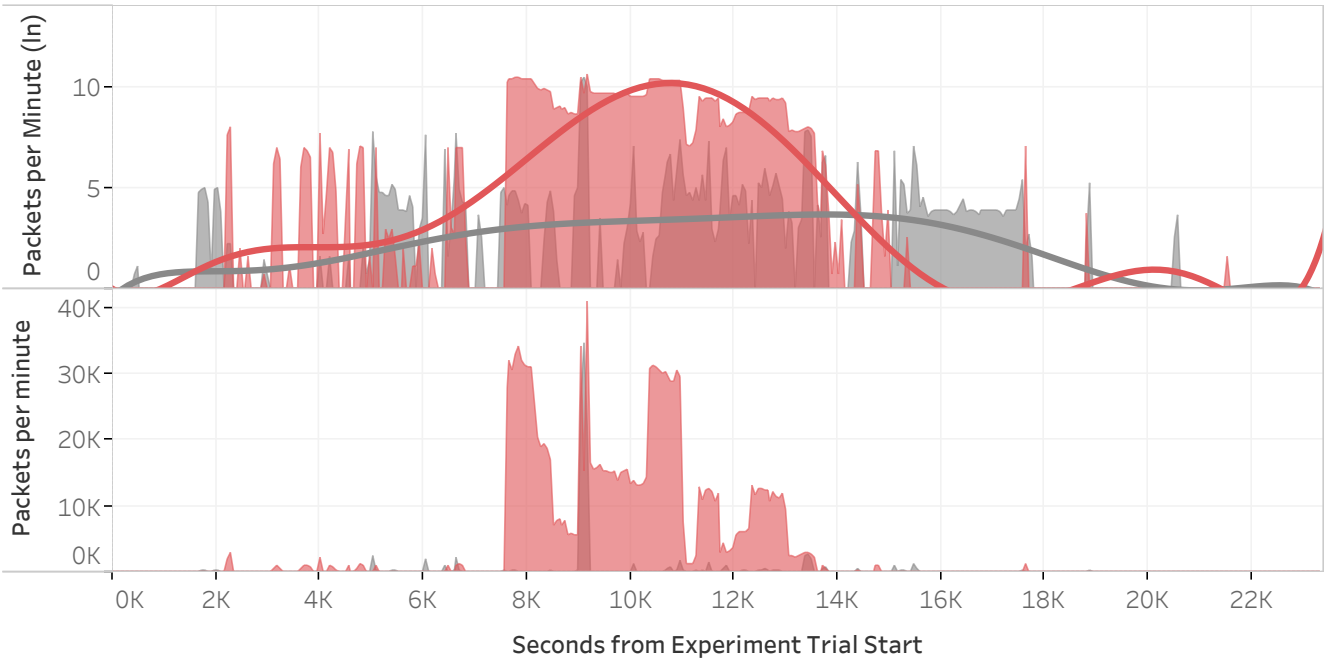
Running Sum of Packets



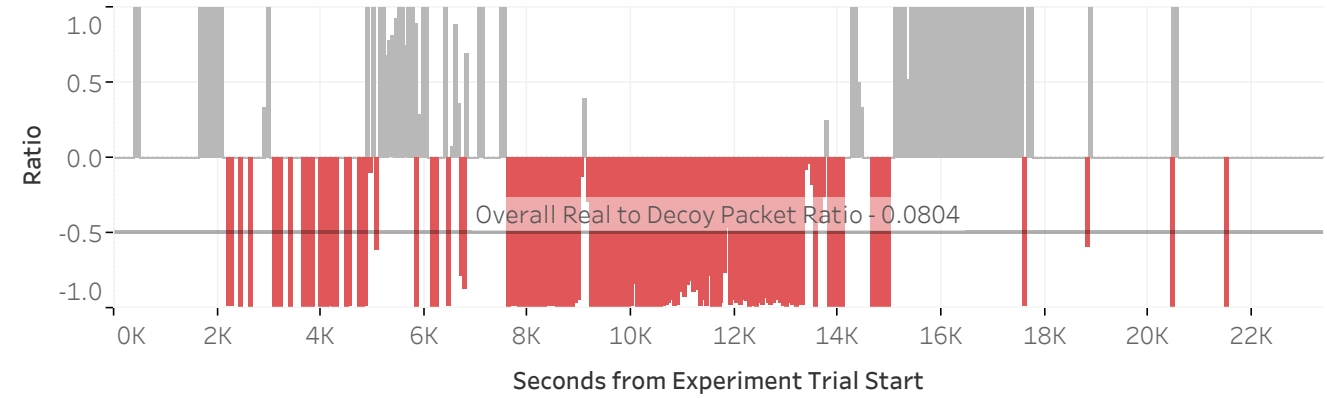
S132 - Day1 - PU

Legend
Real Systems
Decoy Systems

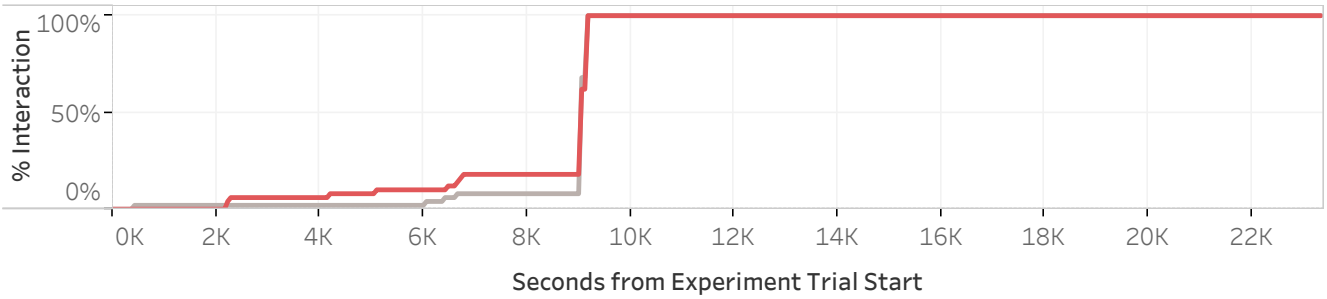
Real & Decoy Packets per Minute

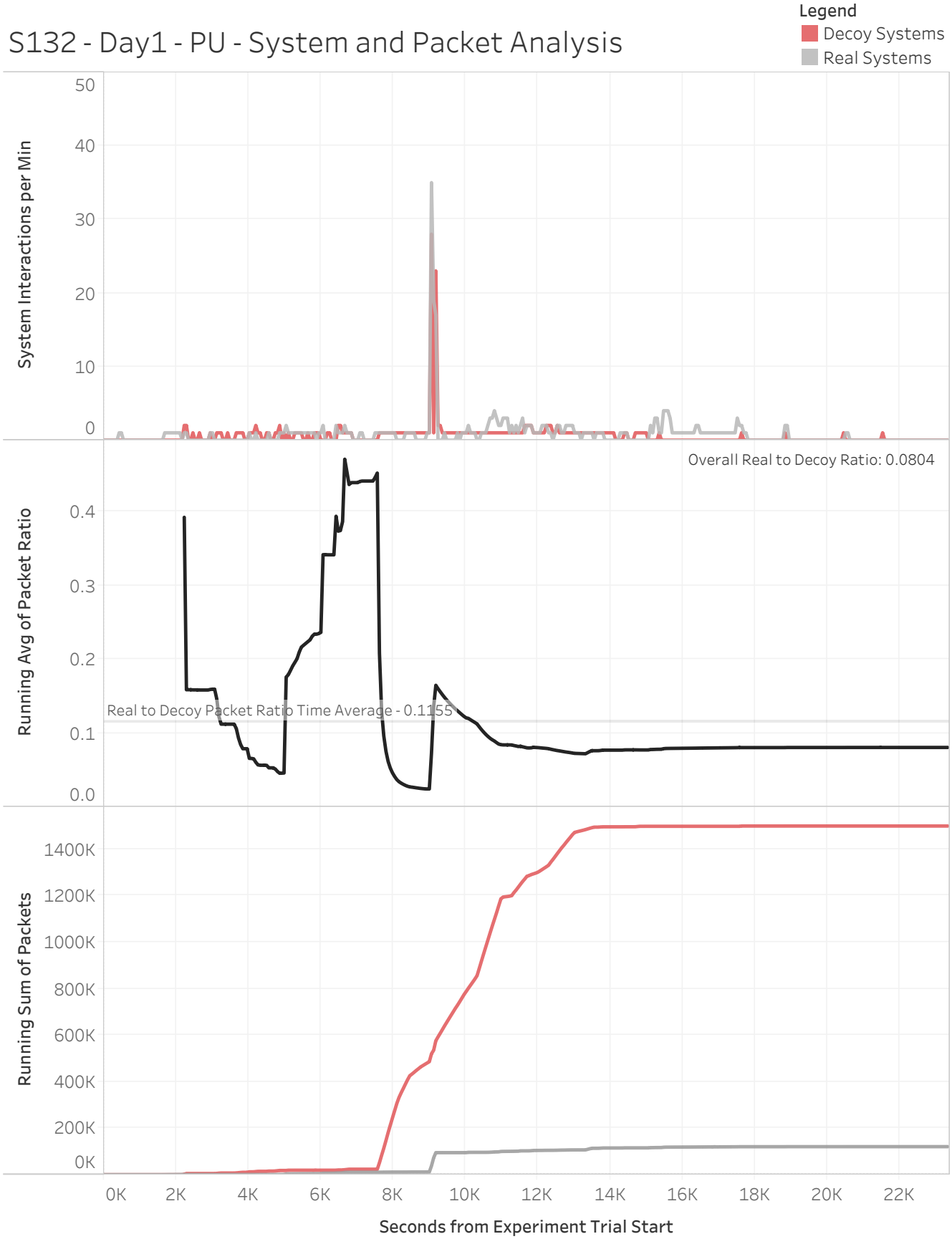


Real to Decoy Packet Ratio



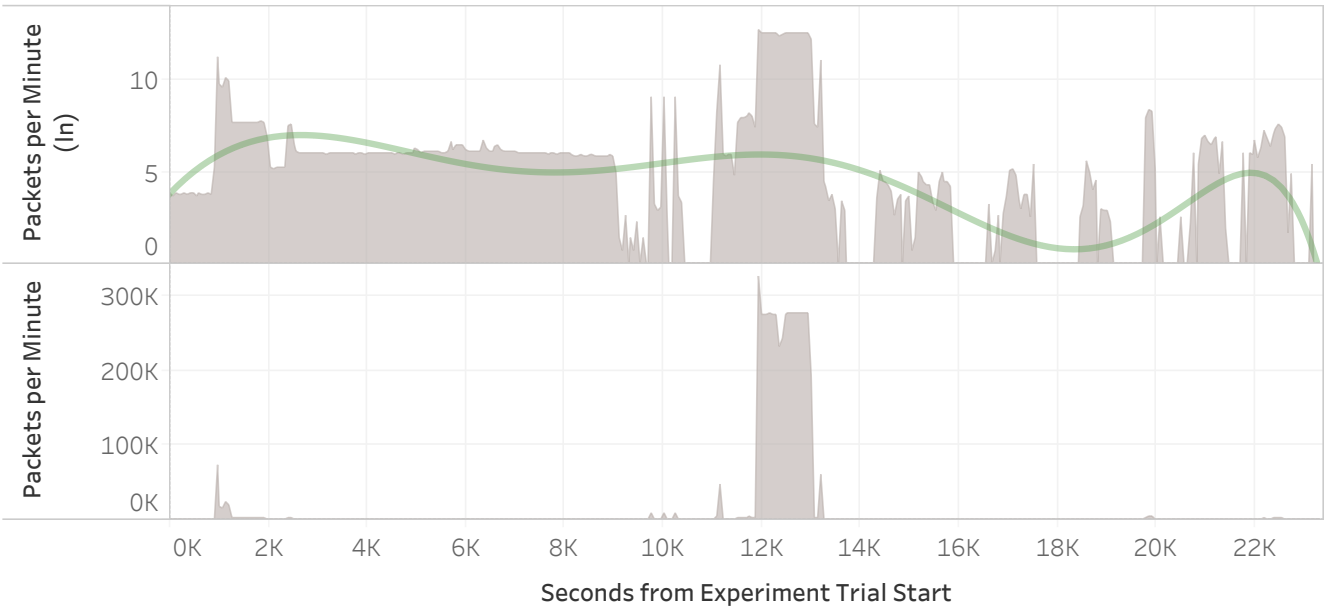
Real & Decoy System Interaction Timeline



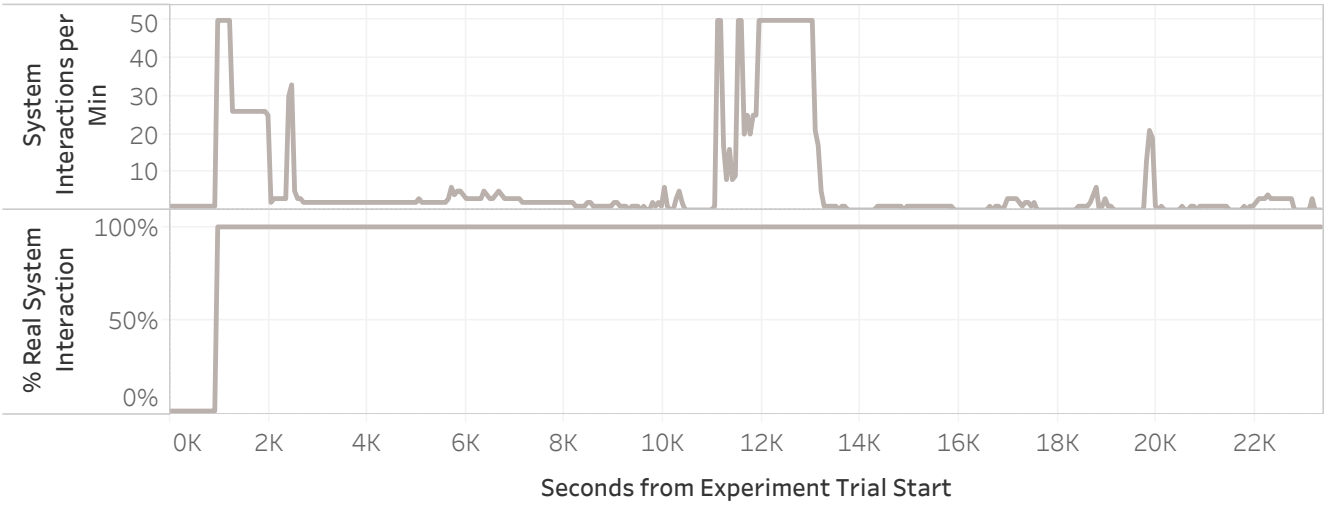

S132 - Day1 - PU - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Overall Real to Decoy Ratio: 0.0804
Running Avg of Packet Ratio
0.4
0.3
0.2
0.1
0.0
Real to Decoy Packet Ratio Time Average - 0.1155
Running Sum of Packets
1400K
1200K
1000K
800K
600K
400K
200K
0K
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

S133 - Day 1 - AU

Real Packets per Minute



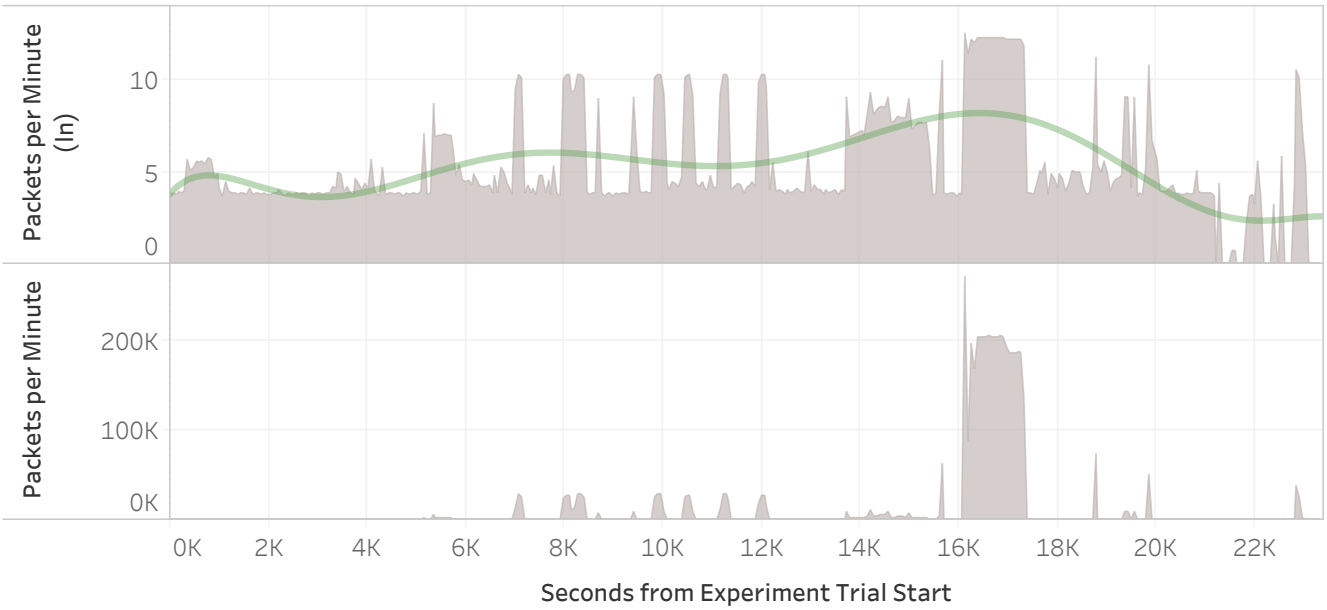
Real System Interaction Timeline



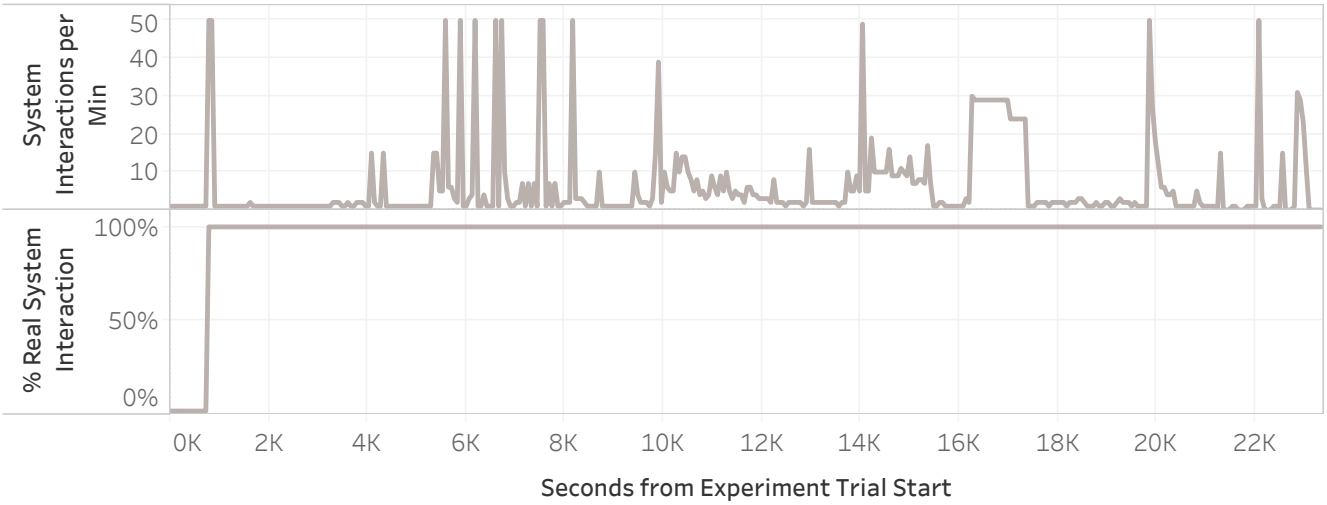
Running Sum of Packets

S134 - Day 1 - AU

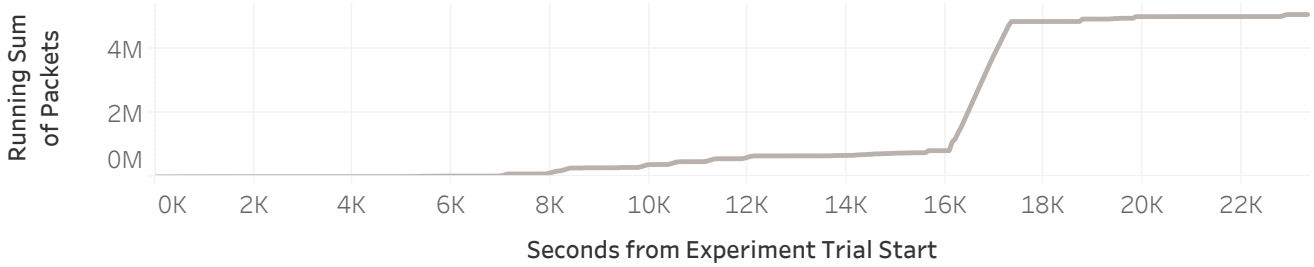
Real Packets per Minute



Real System Interaction Timeline

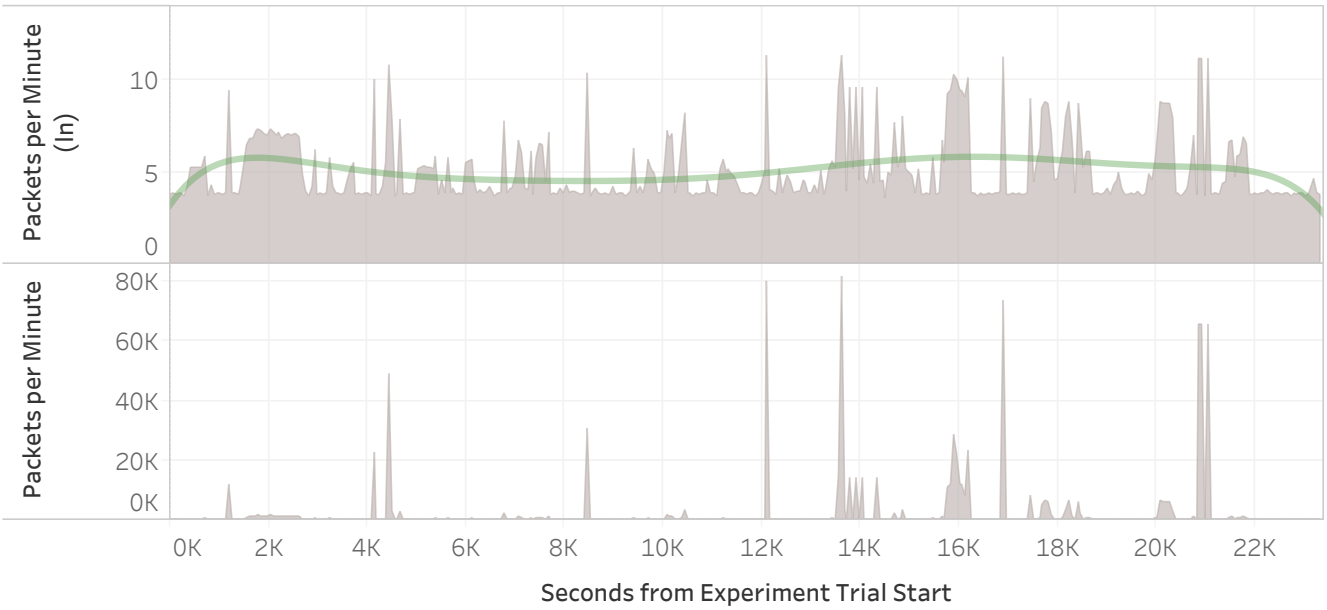


Running Sum of Packets

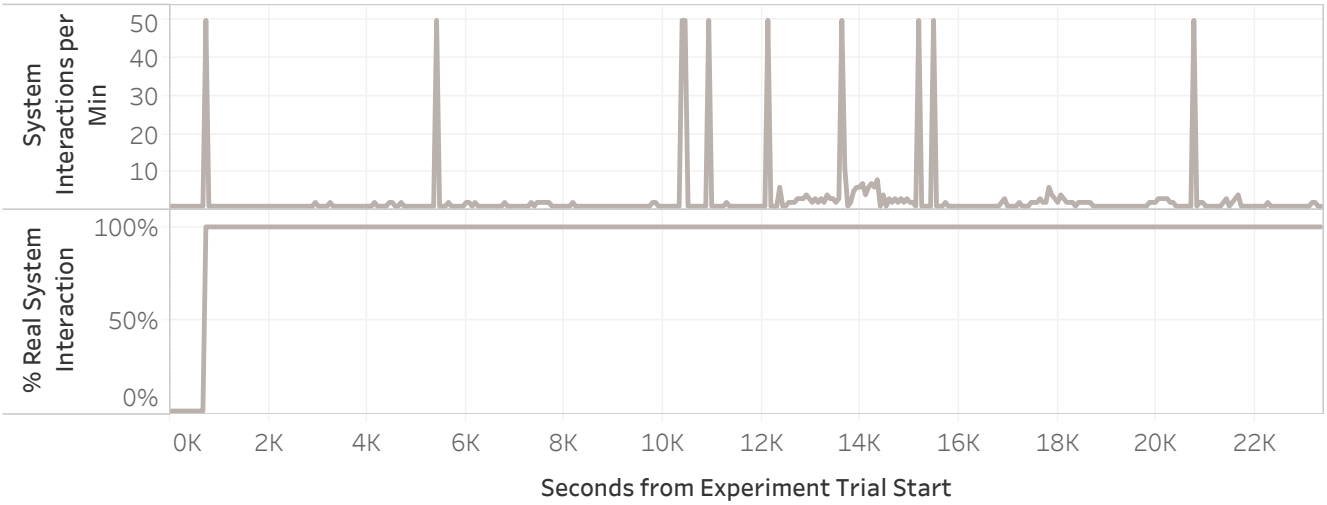


S135 - Day 1 - AU

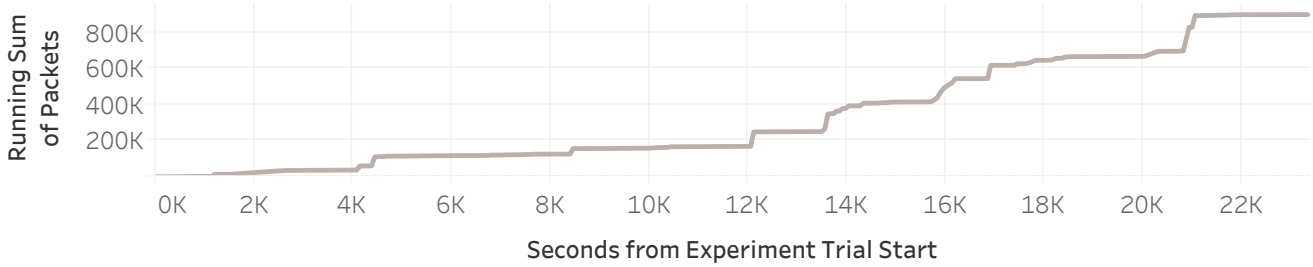
Real Packets per Minute



Real System Interaction Timeline

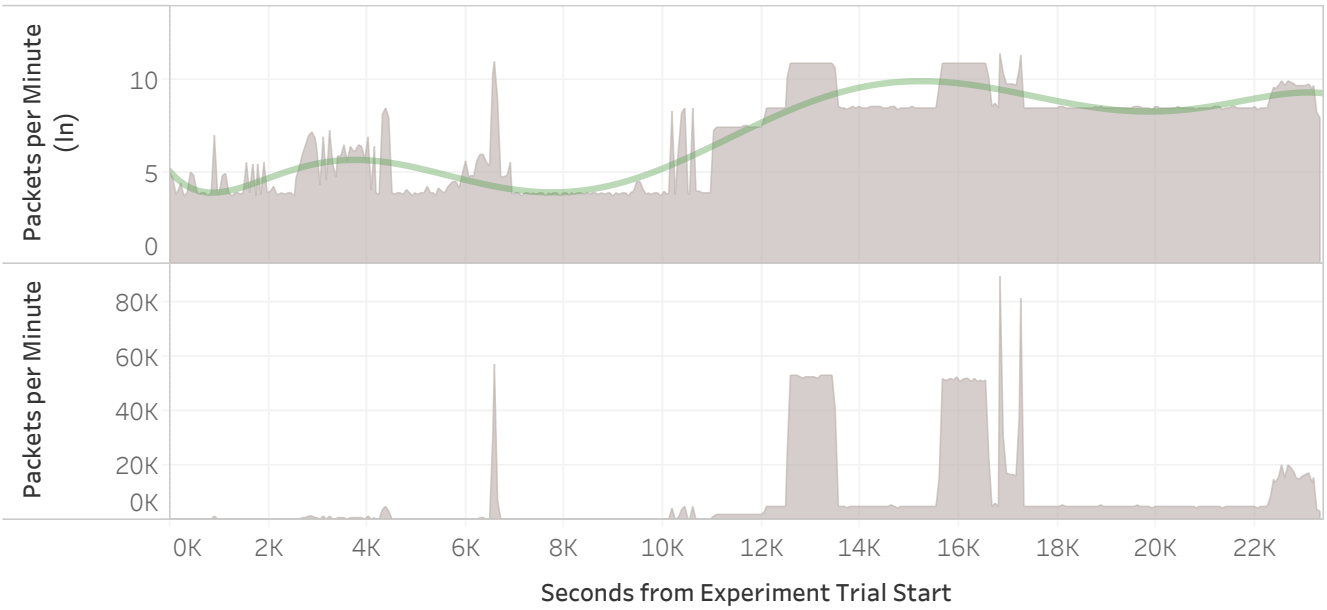


Running Sum of Packets

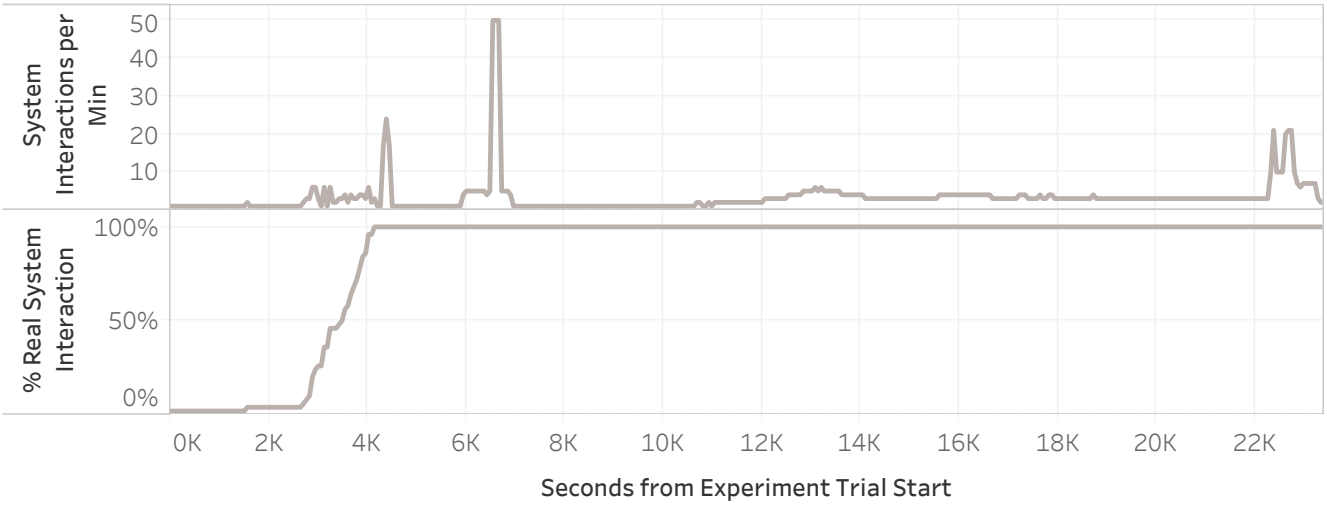


S136 - Day 1 - AU

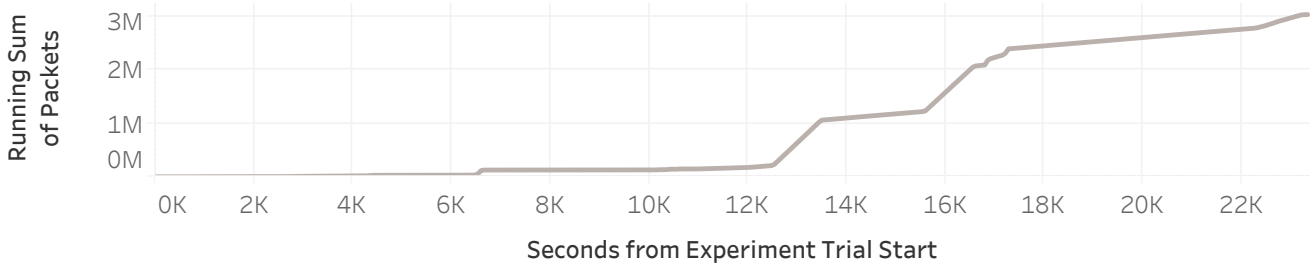
Real Packets per Minute



Real System Interaction Timeline

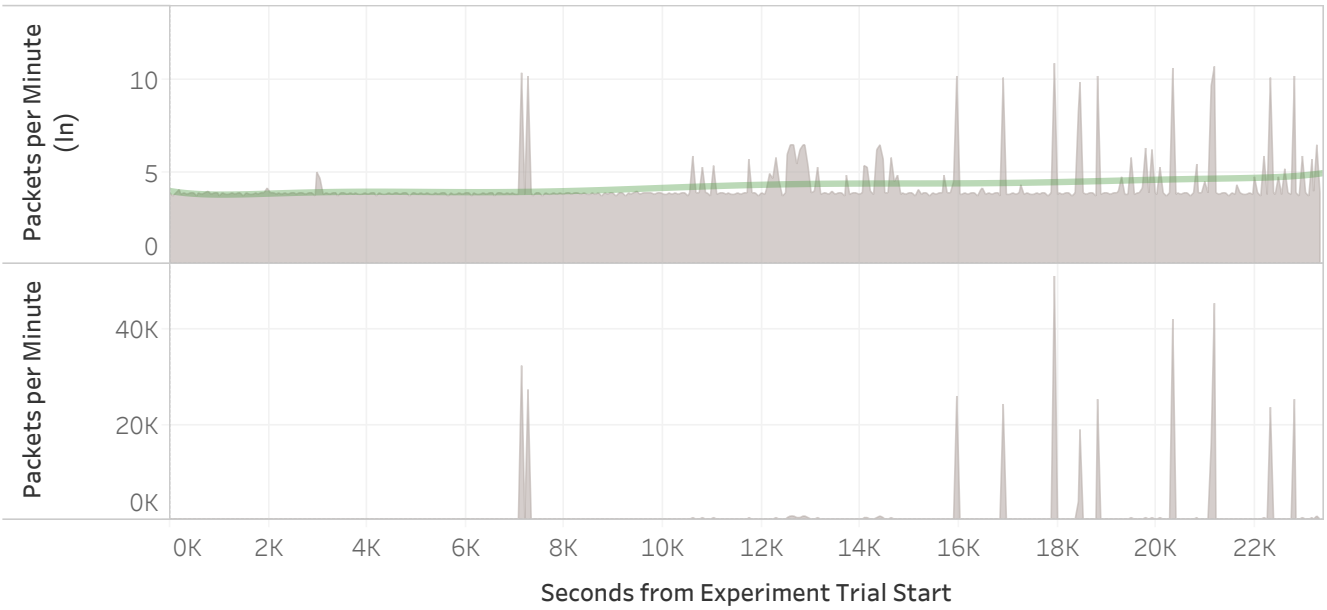


Running Sum of Packets

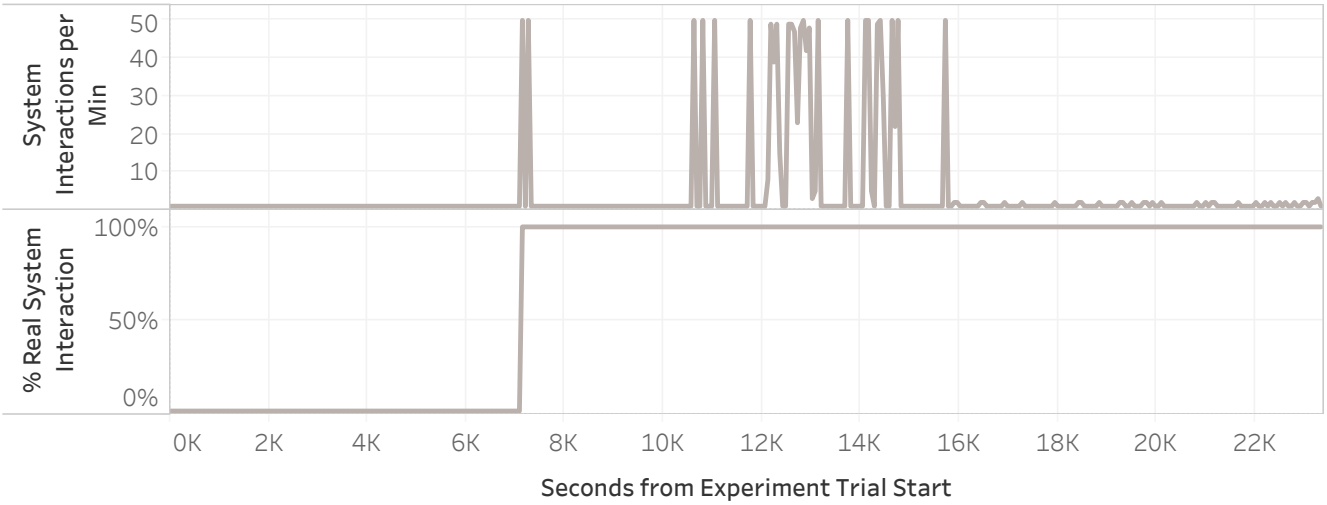


S137 - Day 1 - AU

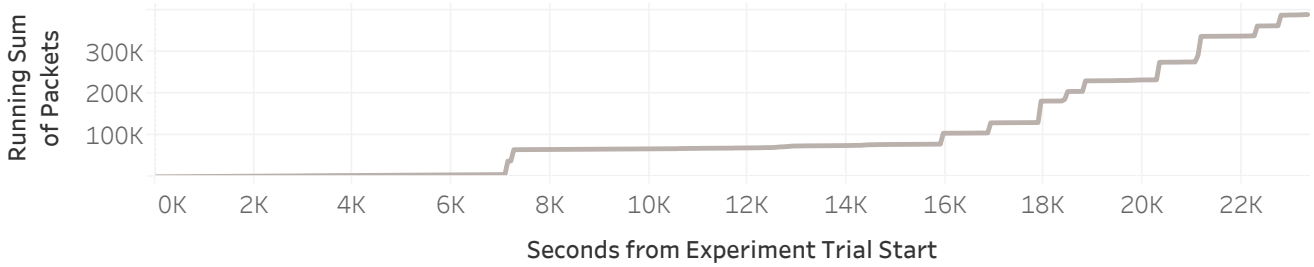
Real Packets per Minute



Real System Interaction Timeline

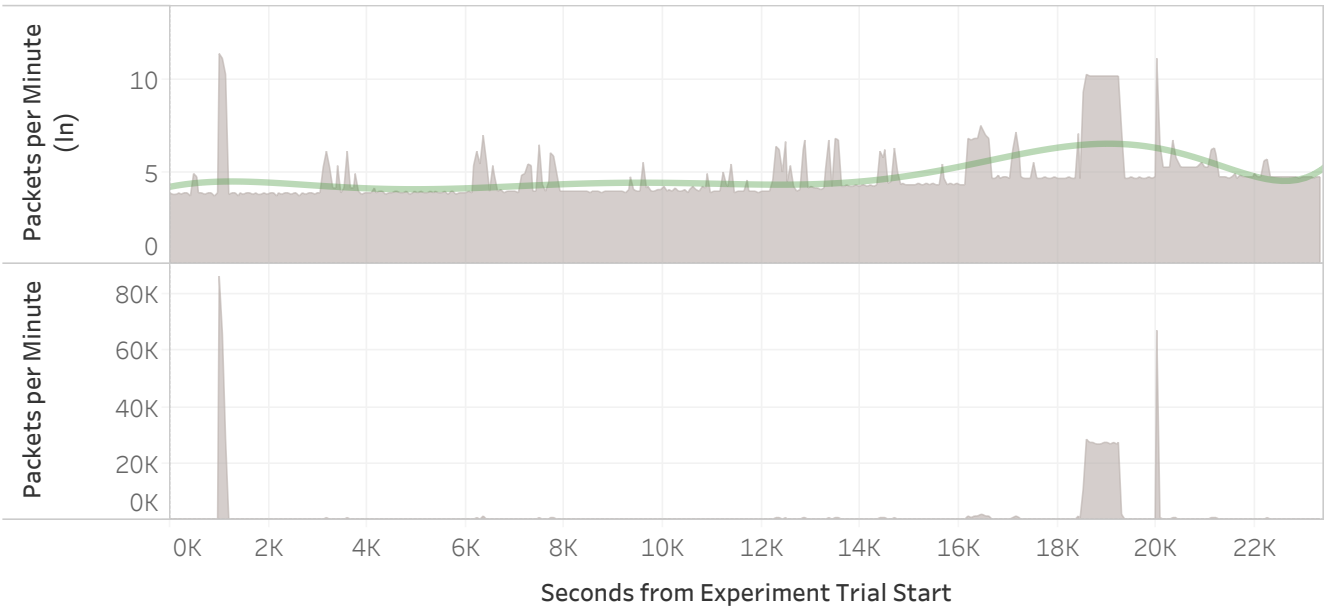


Running Sum of Packets

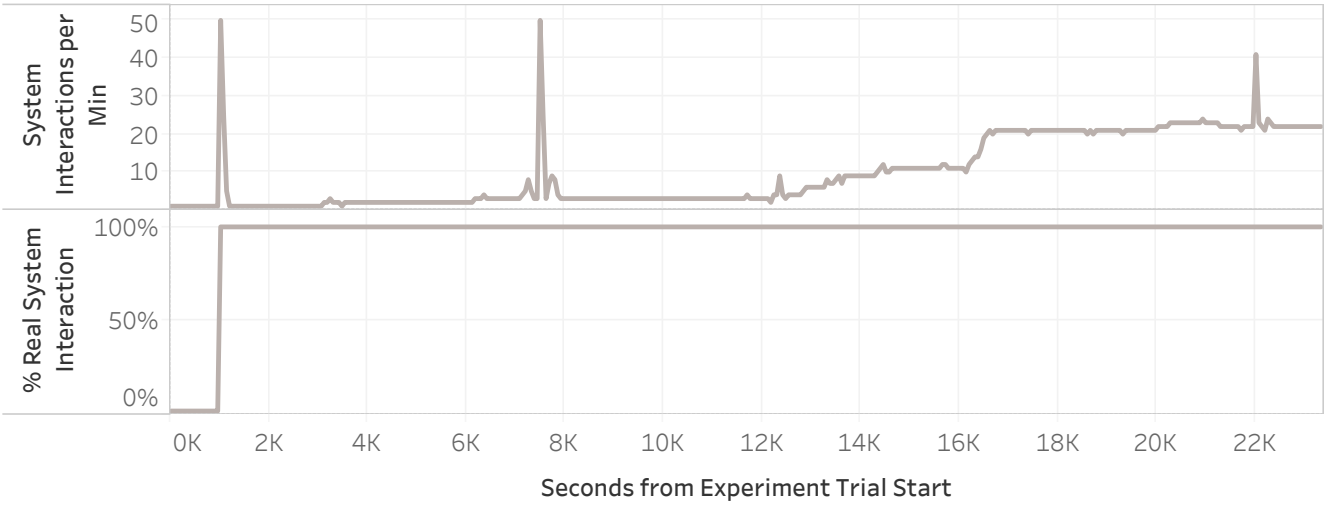


S138 - Day 1 - AU

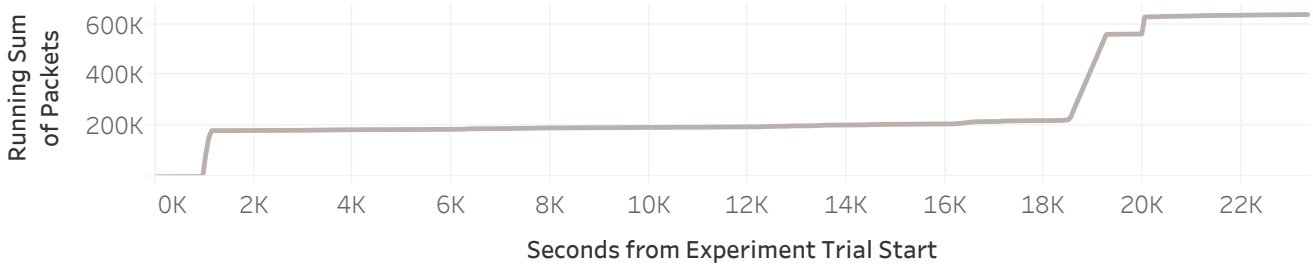
Real Packets per Minute



Real System Interaction Timeline

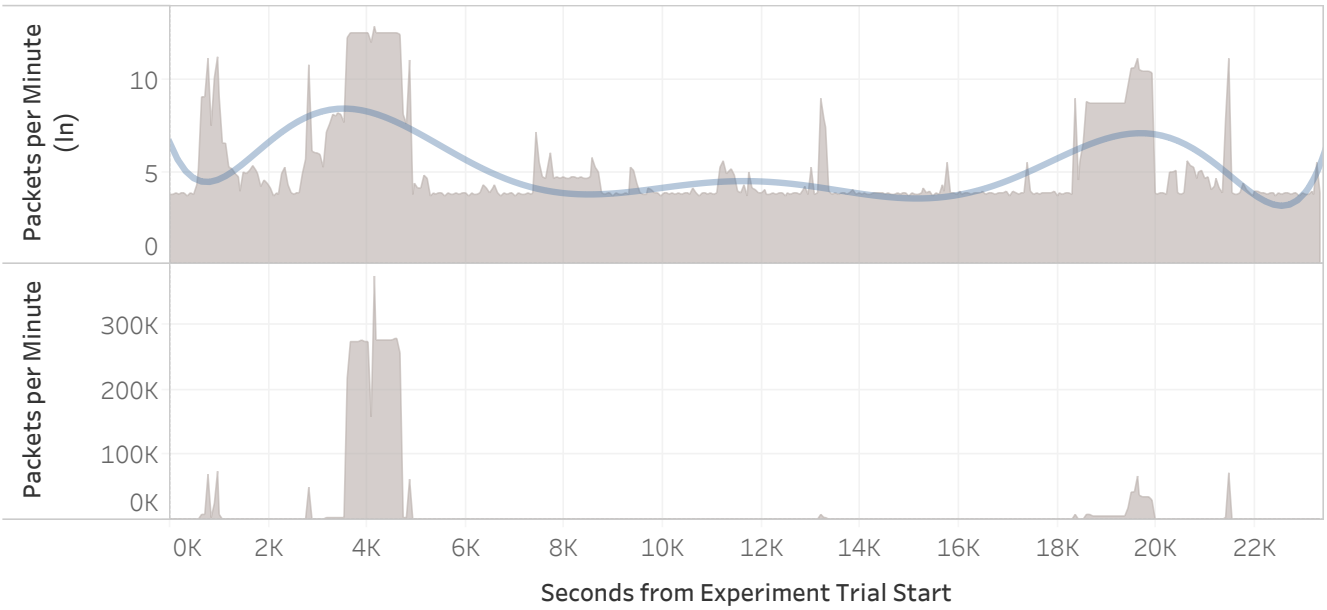


Running Sum of Packets

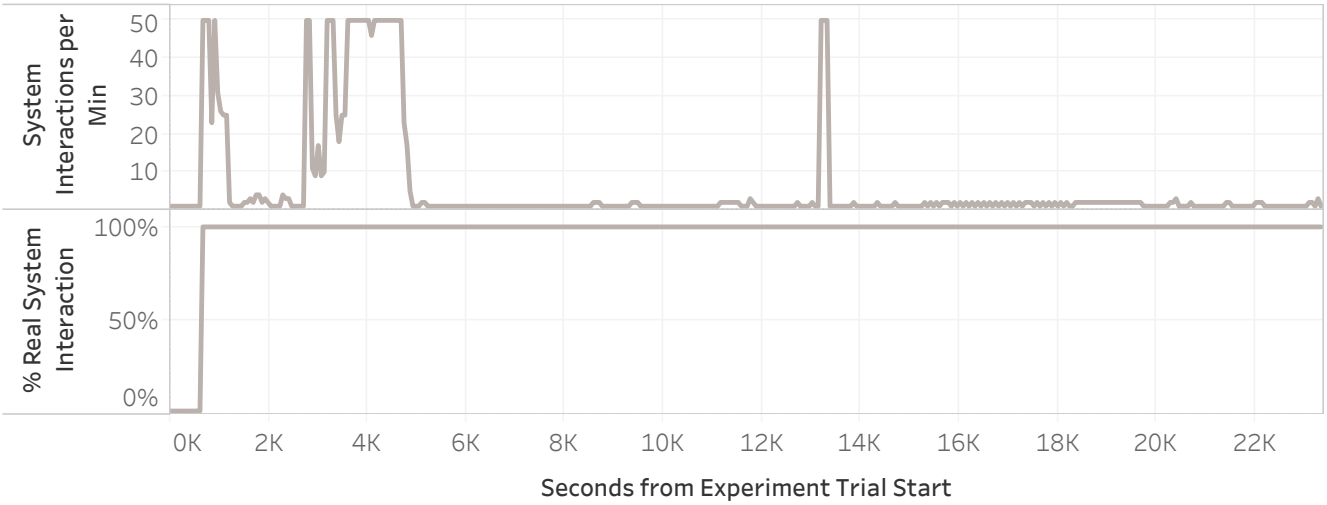


S139 - Day 1 - AI

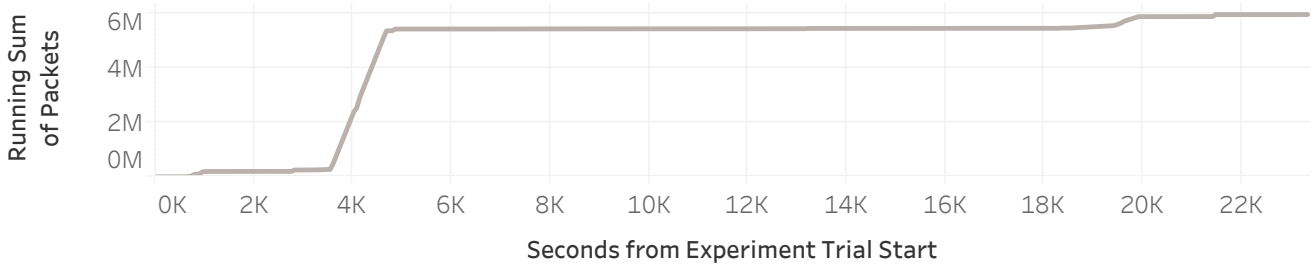
Real Packets per Minute



Real System Interaction Timeline



Running Sum of Packets



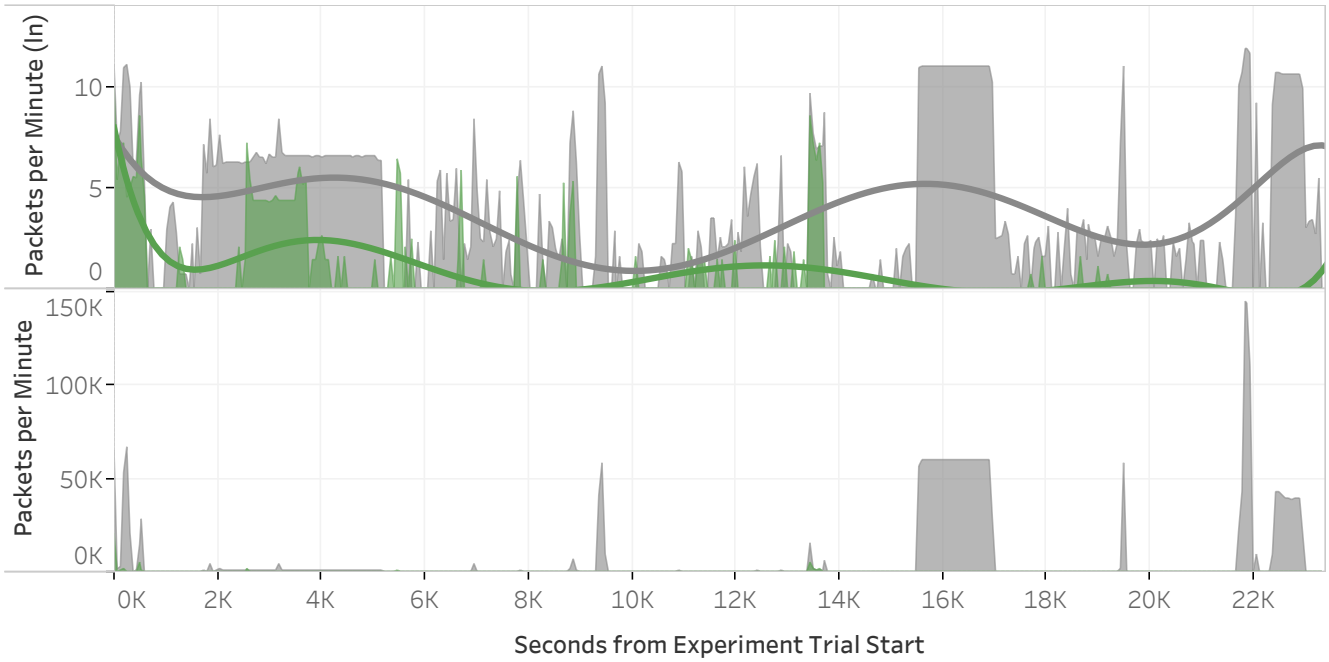
Day 2 Subject Exclusions

For Day 2 data analyzed there was an overall reduction of 9 subjects. Two subjects (S70 and S80) did not return for Day 2 of the experiment, with data collection issues impacting seven additional subjects (S18, S24, S25, S26, S28, S49, S55 and S88). Two subjects (S15 and S110) were excluded from Day 2 analysis for the same reason they were excluded from Day 1 analysis, interacting with only a single system on the network. Day 2 data from one subject (S64) excluded from Day 1 analysis for starting activity prior to the start of the experiment was included for Day 2 analysis as all Day 2 system interactions occurred after the designated start time. After the completion of data analysis for this dissertation, a data collection issue was identified for one subject (S132) included in the Day 2 analysis, which indicated only partial collection of the overall activity for the subject.

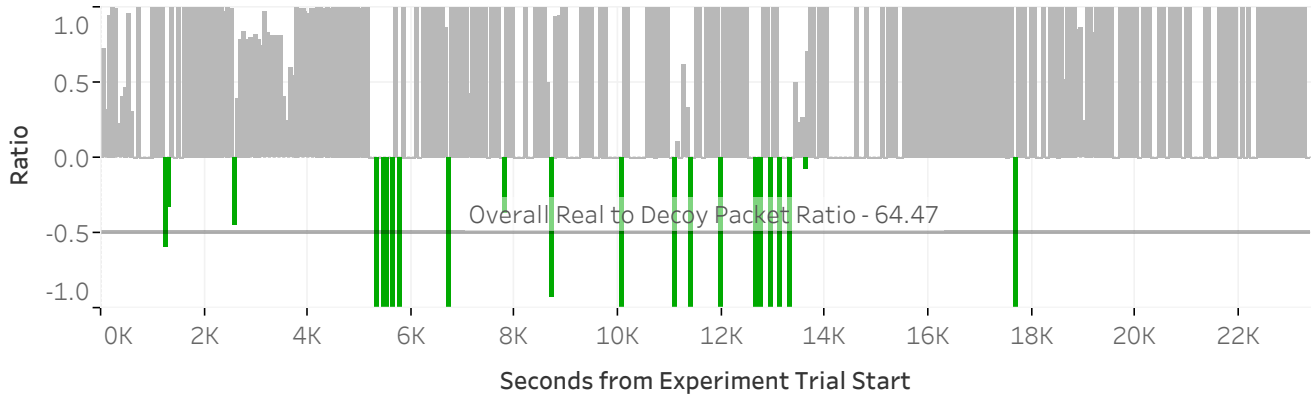
S06 - Day2 - AUPU

Legend
Real Systems
Decoy Systems

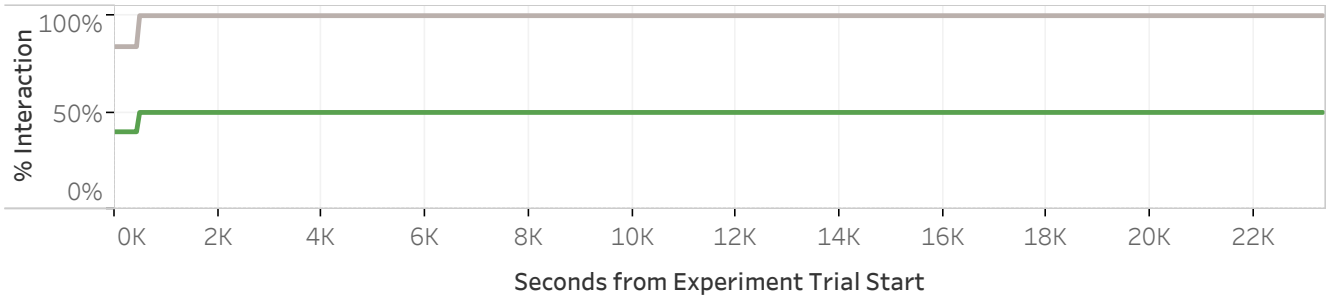
Real & Decoy Packets per Minute

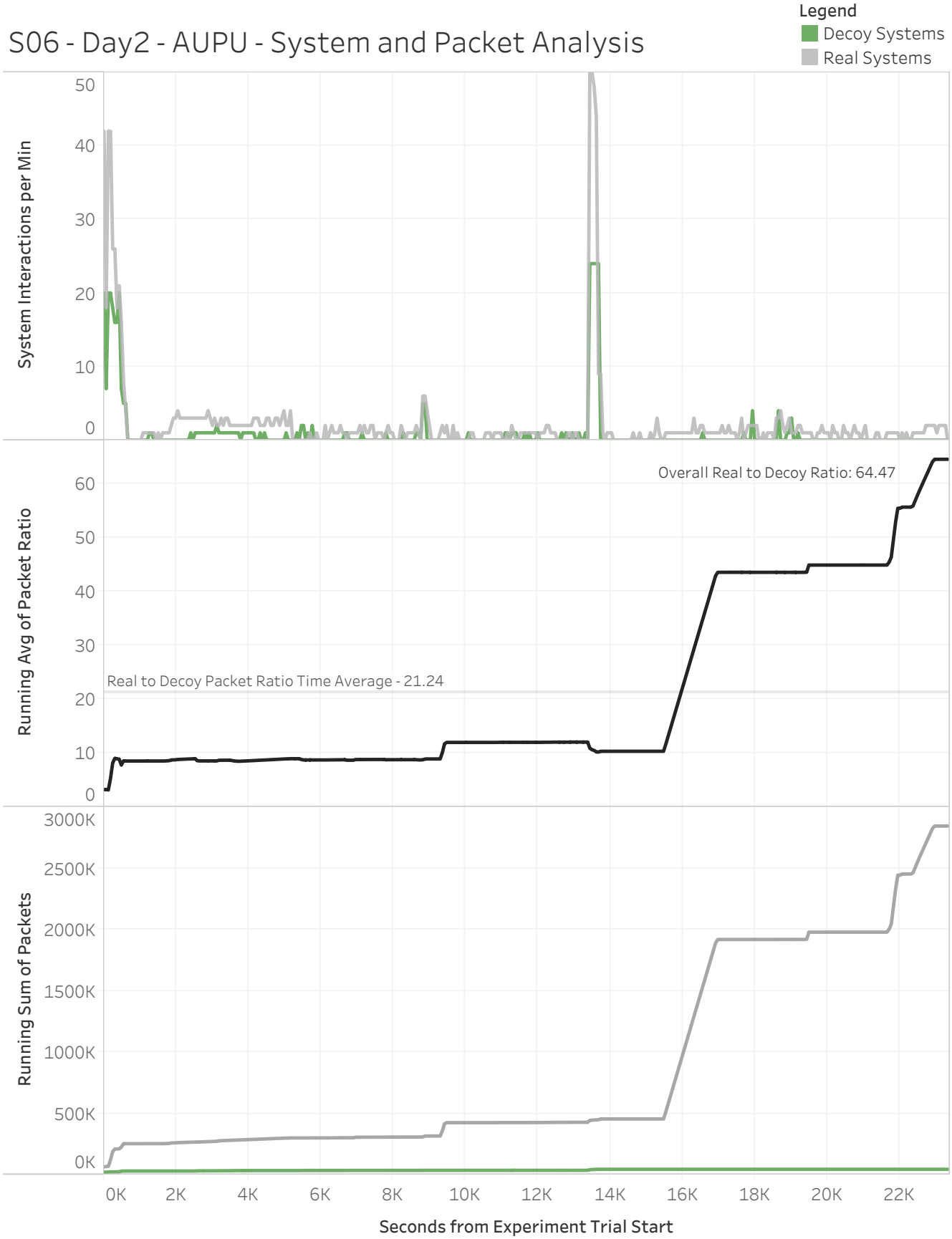


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

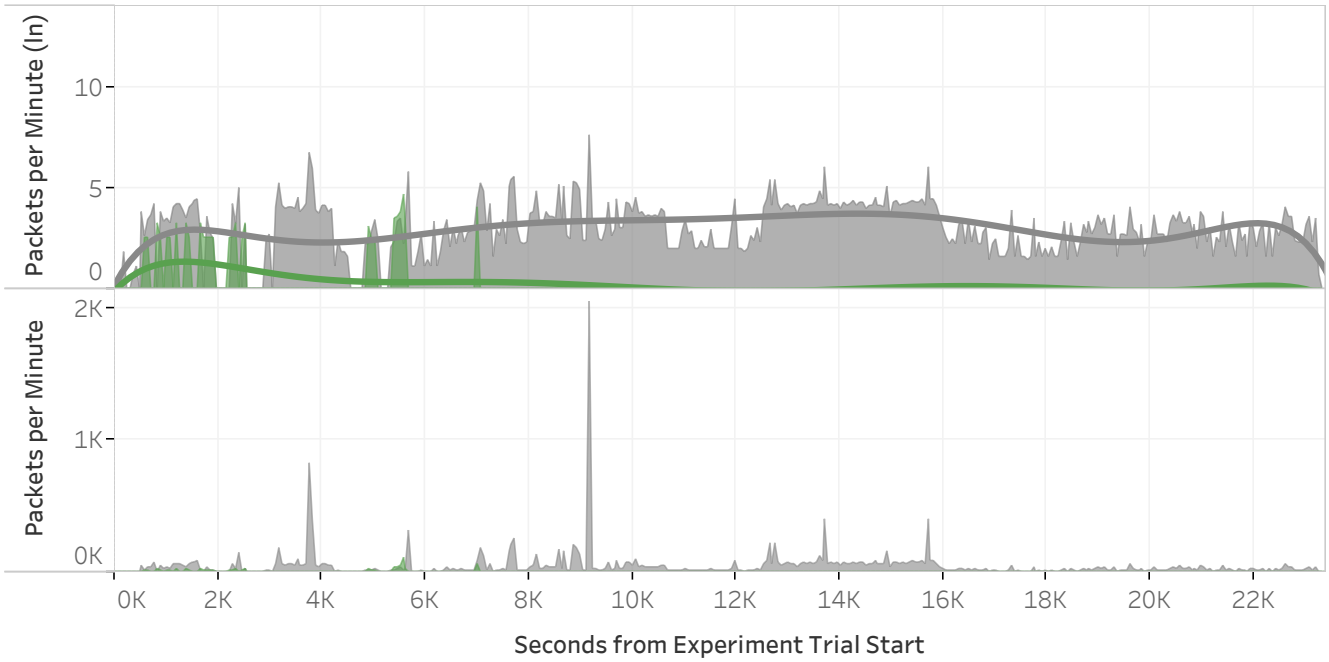



S06 - Day2 - AUPU - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
60
50
40
30
20
10
0
Overall Real to Decoy Ratio: 64.47
Real to Decoy Packet Ratio Time Average - 21.24
Running Sum of Packets
3000K
2500K
2000K
1500K
1000K
500K
0K
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

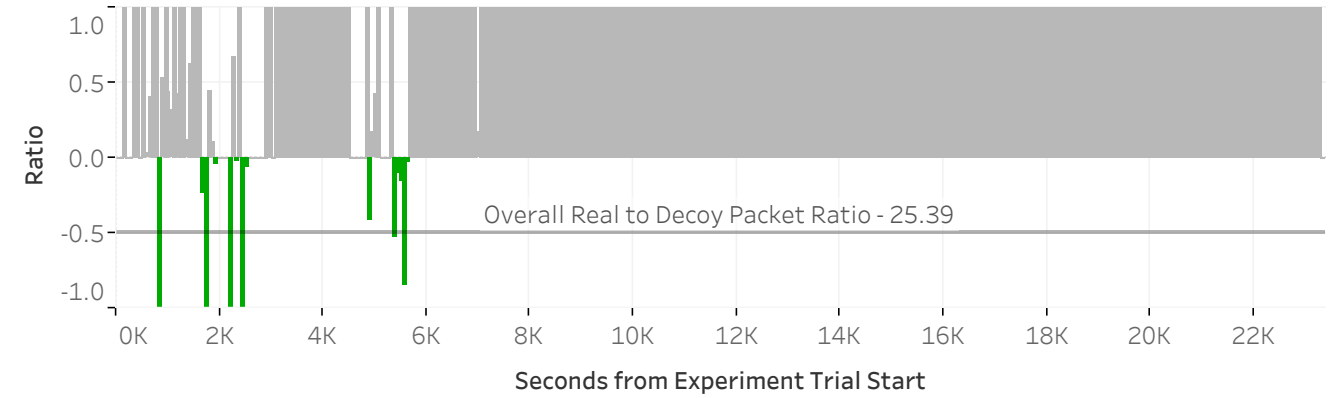
S07 - Day2 - AUPU

Legend
Real Systems
Decoy Systems

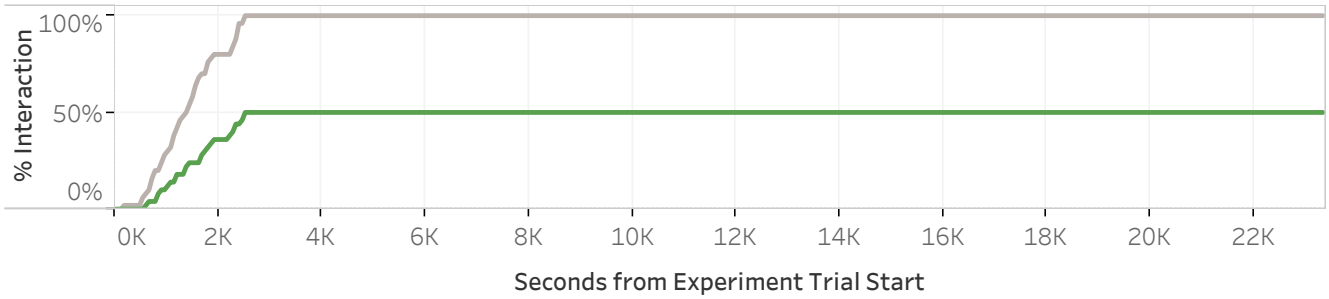
Real & Decoy Packets per Minute

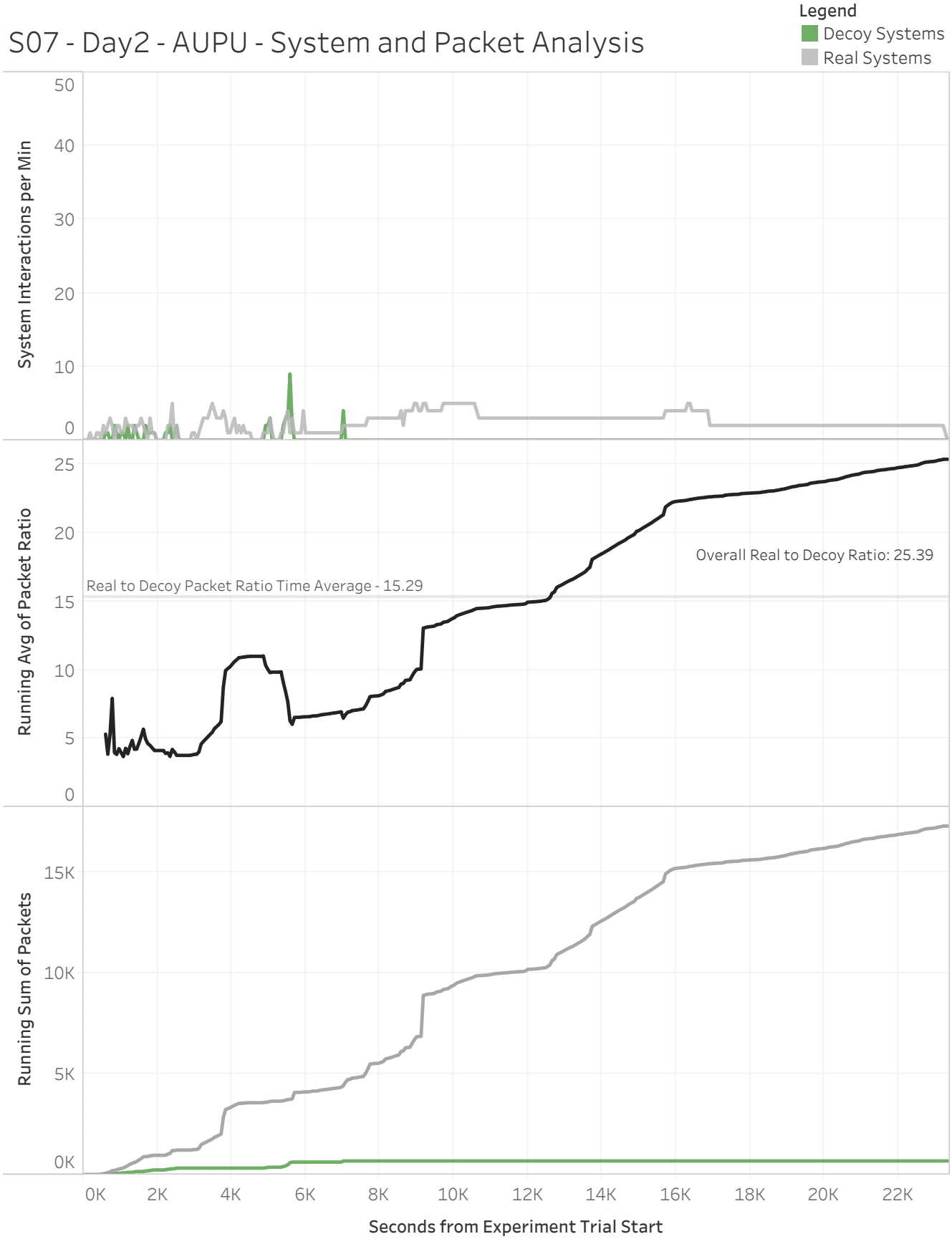


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

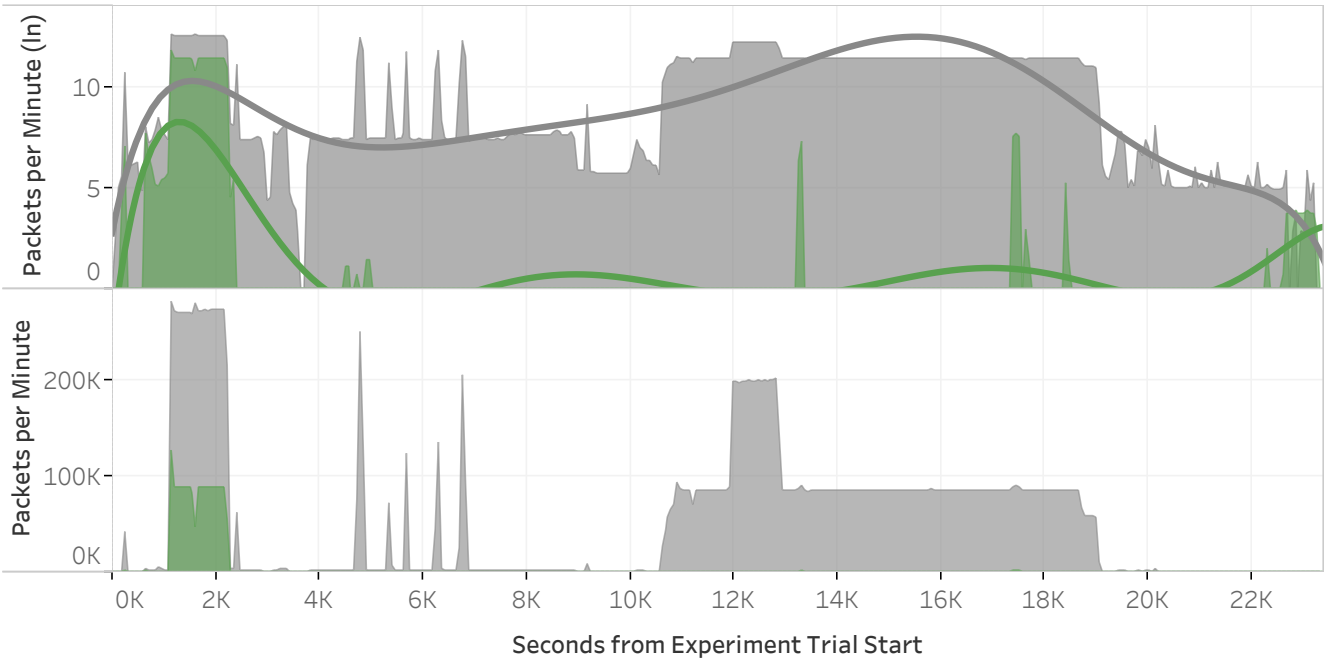



S07 - Day2 - AUPU - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
25
20
15
10
5
0
Real to Decoy Packet Ratio Time Average - 15.29
Overall Real to Decoy Ratio: 25.39
Running Sum of Packets
15K
10K
5K
0K
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

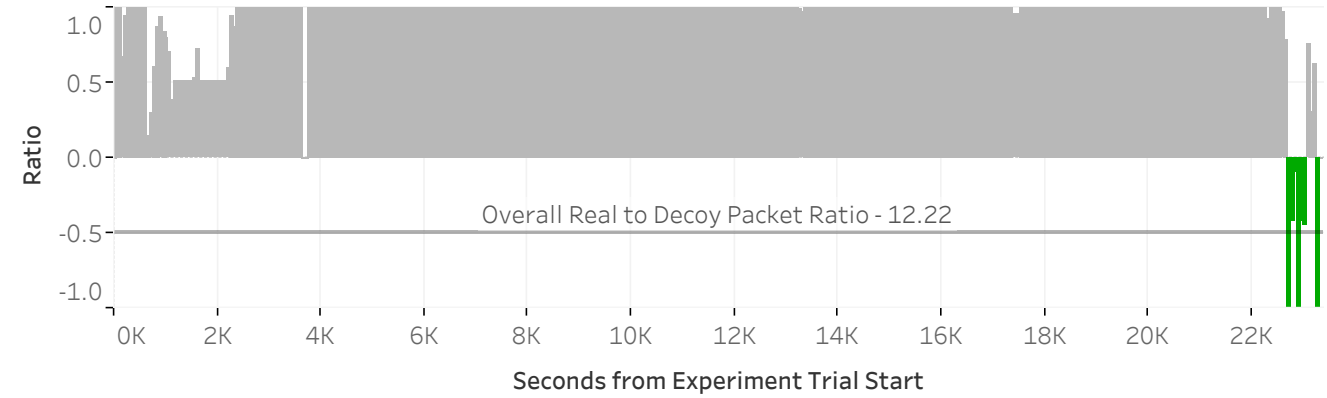
S08 - Day2 - AUPU

Legend
Real Systems
Decoy Systems

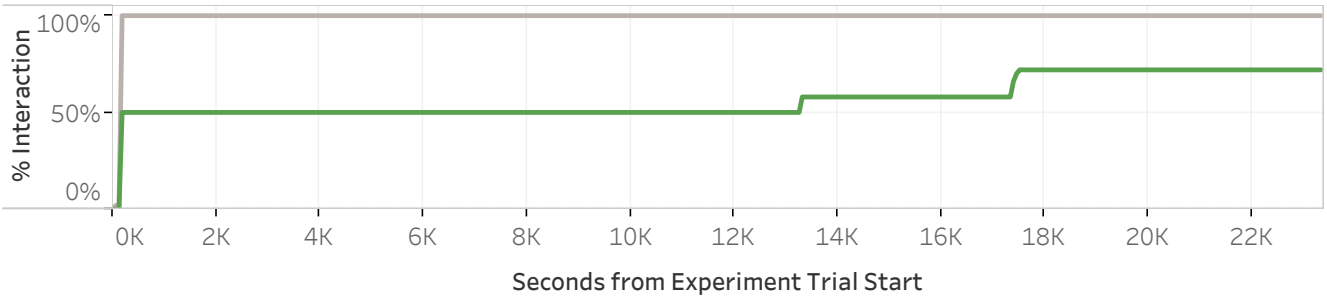
Real & Decoy Packets per Minute

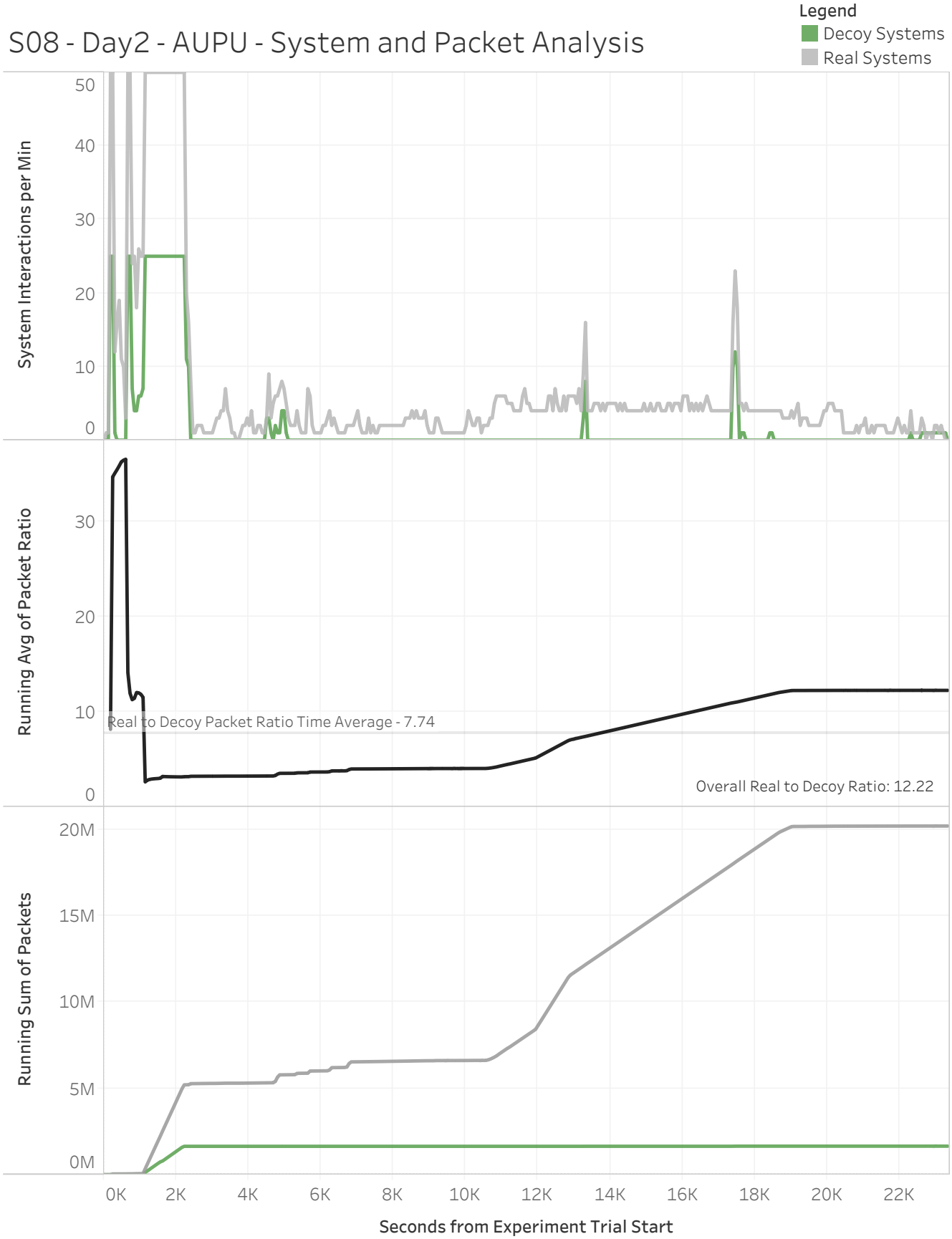


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

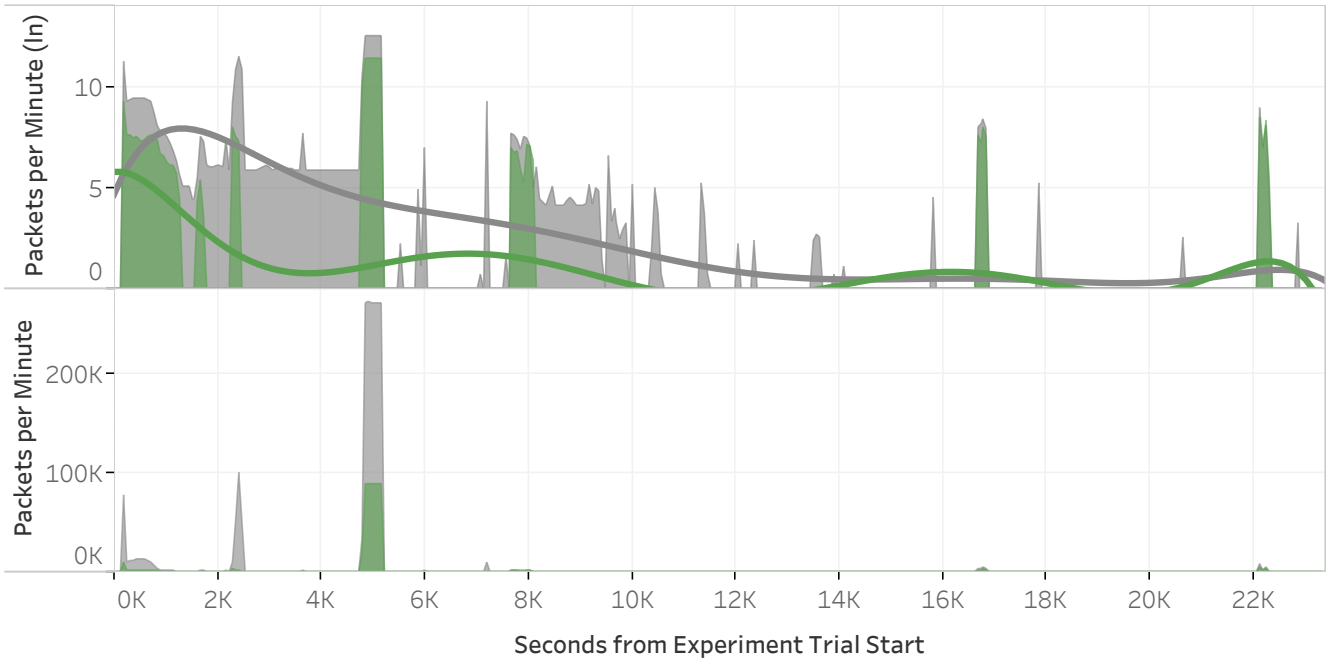



S08 - Day2 - AUPU - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
30
20
10
0
Real to Decoy Packet Ratio Time Average - 7.74
Overall Real to Decoy Ratio: 12.22
Running Sum of Packets
20M
15M
10M
5M
0M
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

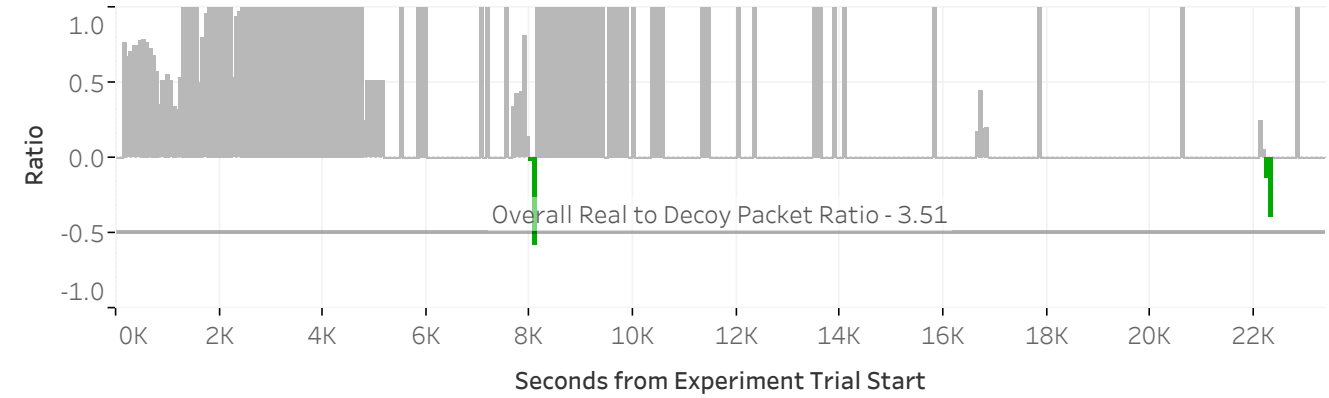
S09 - Day2 - AUPU

Legend
Real Systems
Decoy Systems

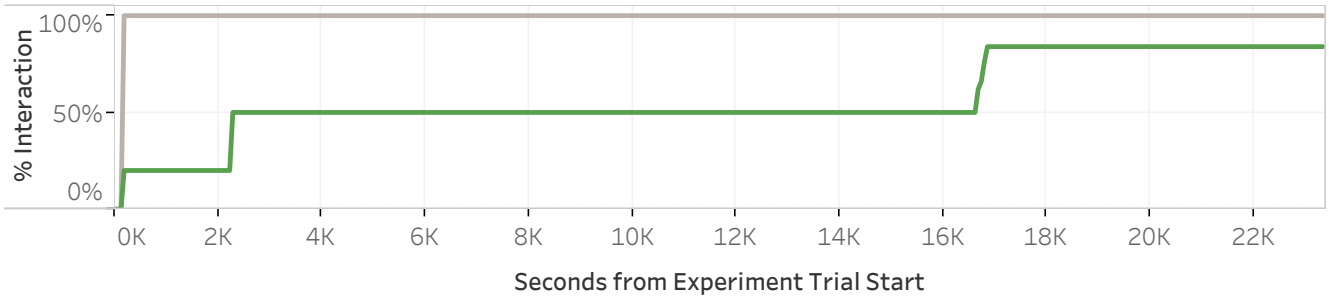
Real & Decoy Packets per Minute

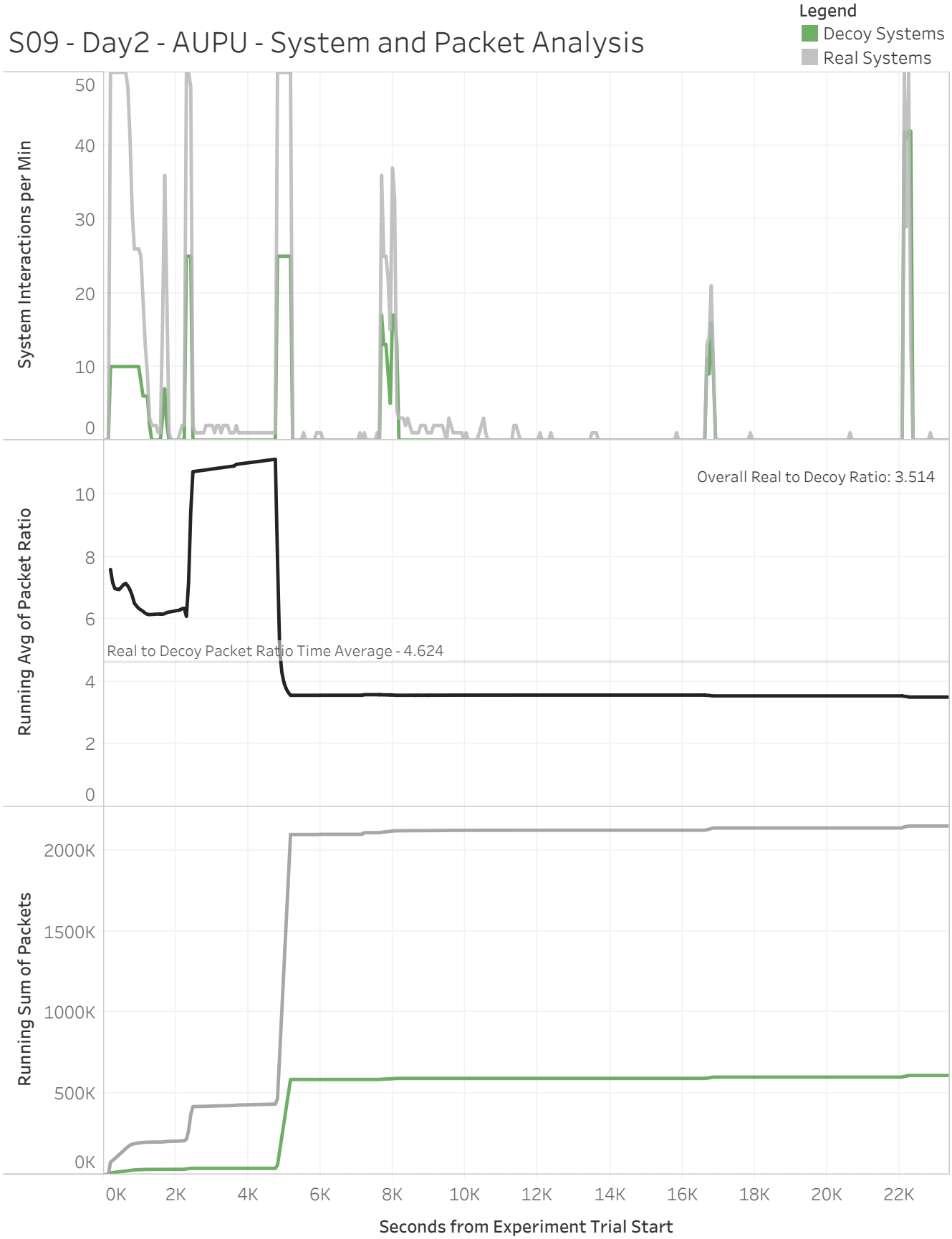


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

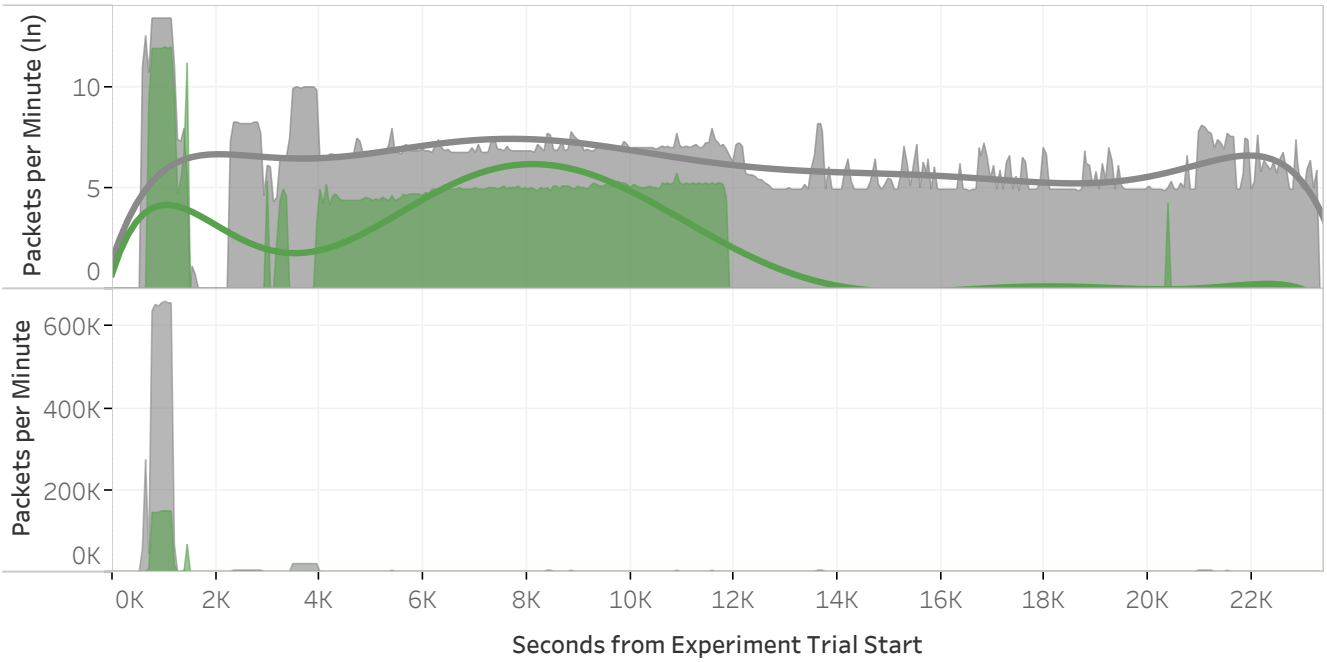



S09 - Day2 - AUPU - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
10
8
6
4
2
0
Overall Real to Decoy Ratio: 3.514
Real to Decoy Packet Ratio Time Average - 4.624
Running Sum of Packets
2000K
1500K
1000K
500K
0K
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

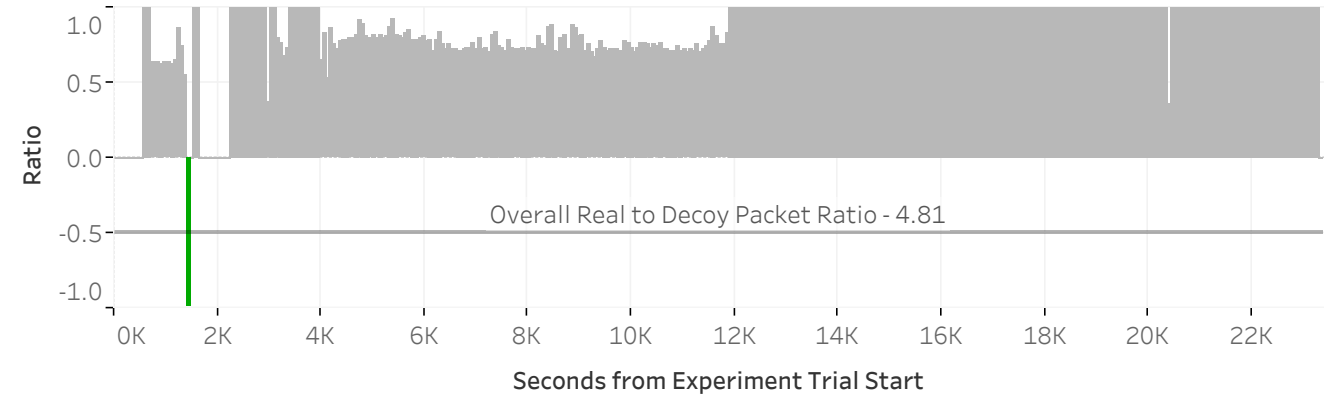
S10 - Day2 - AUPU

Legend
Real Systems
Decoy Systems

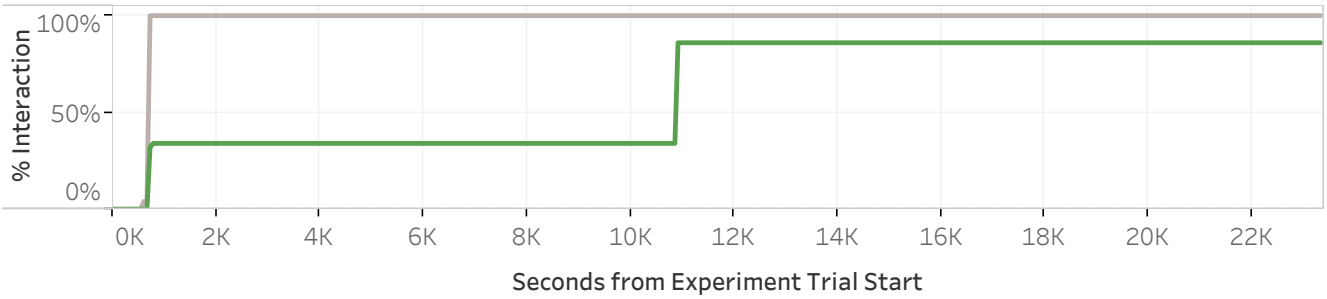
Real & Decoy Packets per Minute

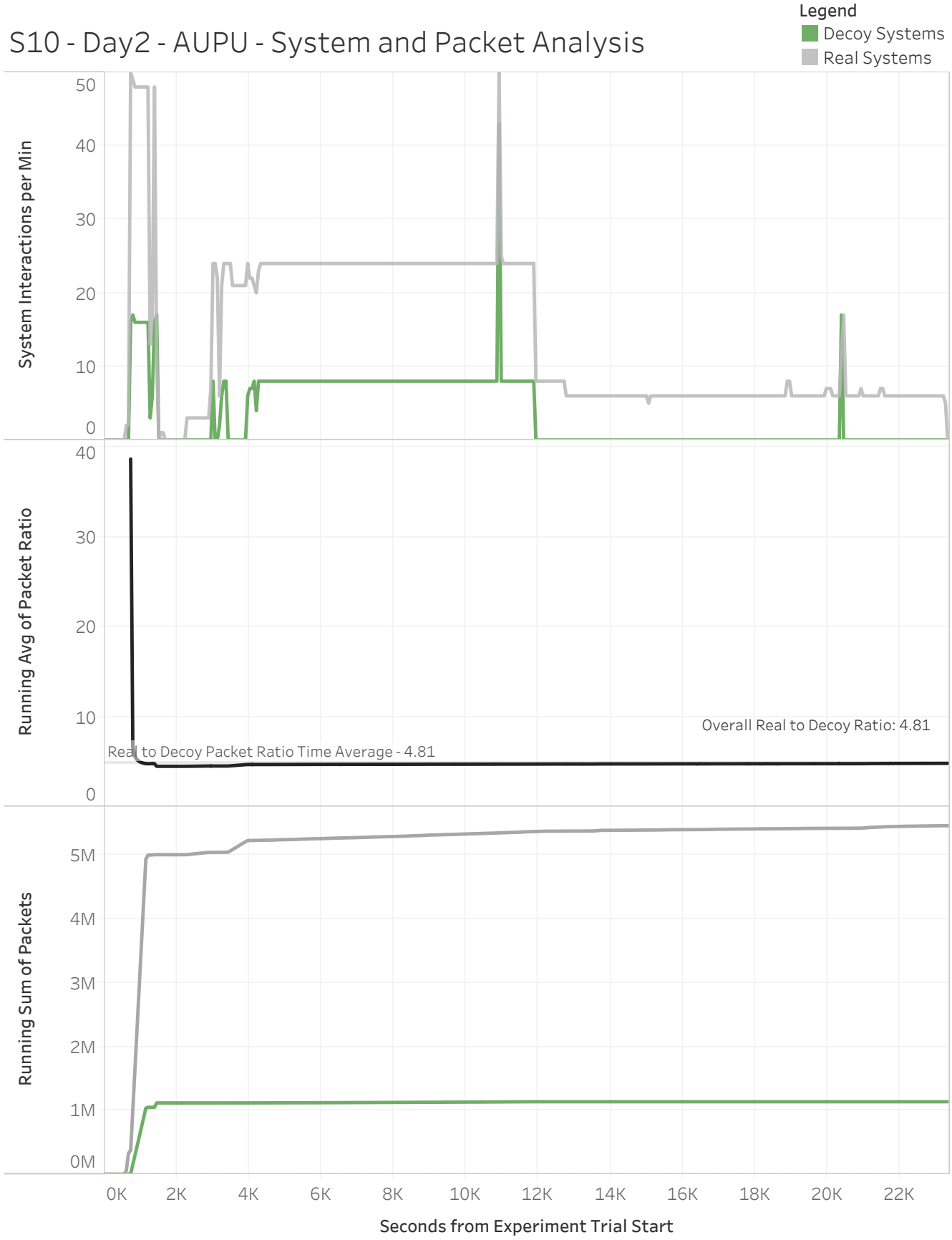


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

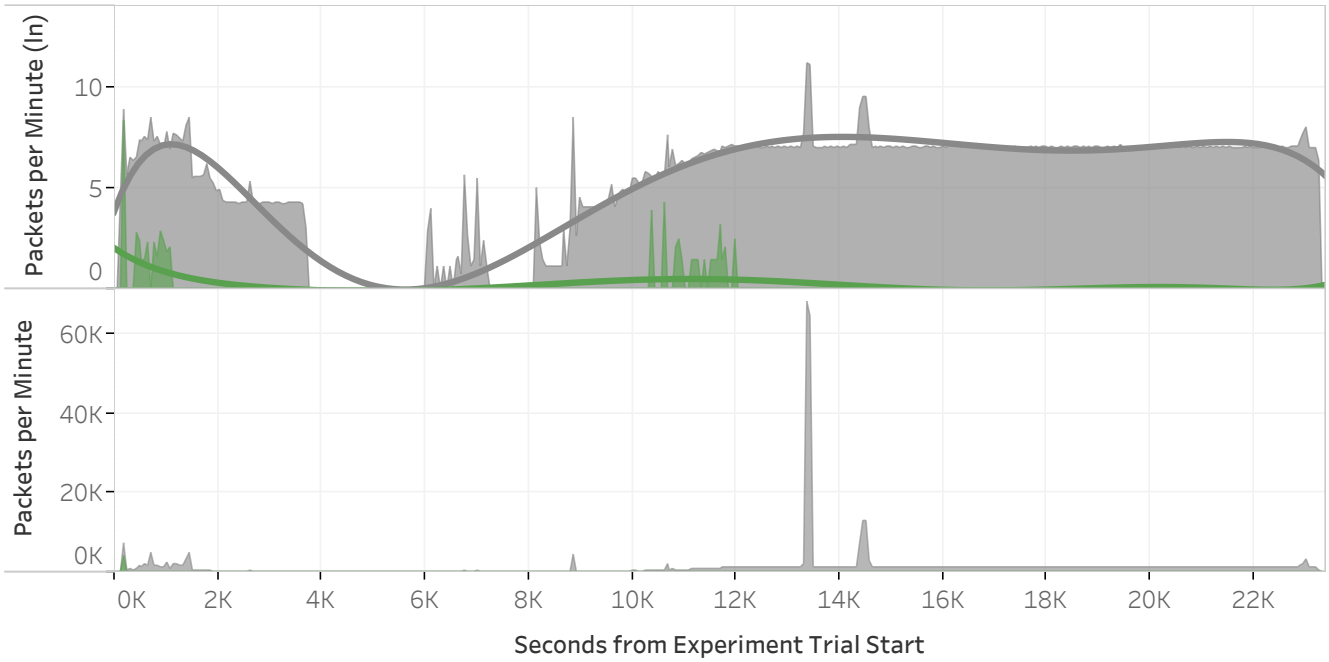



S10 - Day2 - AUPU - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
40
30
20
10
0
Overall Real to Decoy Ratio: 4.81
Real to Decoy Packet Ratio Time Average - 4.81
Running Sum of Packets
5M
4M
3M
2M
1M
0M
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

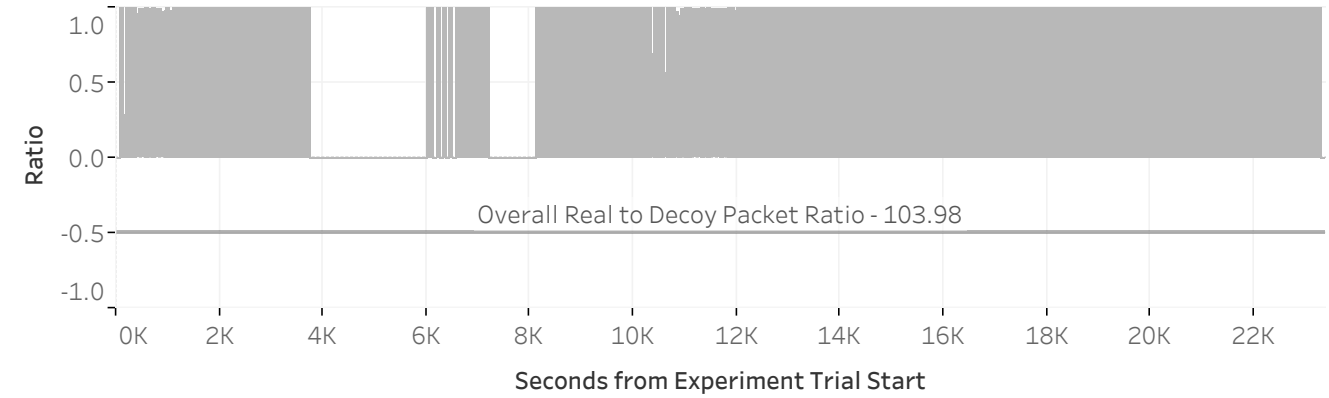
S11 - Day2 - AUPU

Legend
Real Systems
Decoy Systems

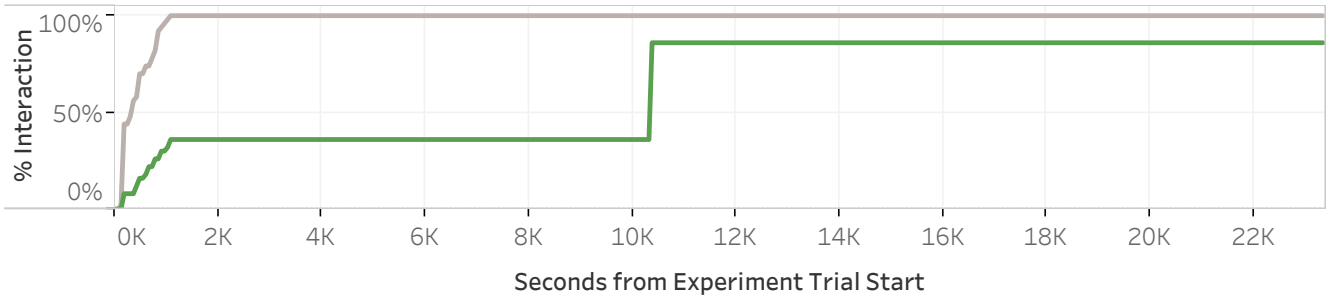
Real & Decoy Packets per Minute



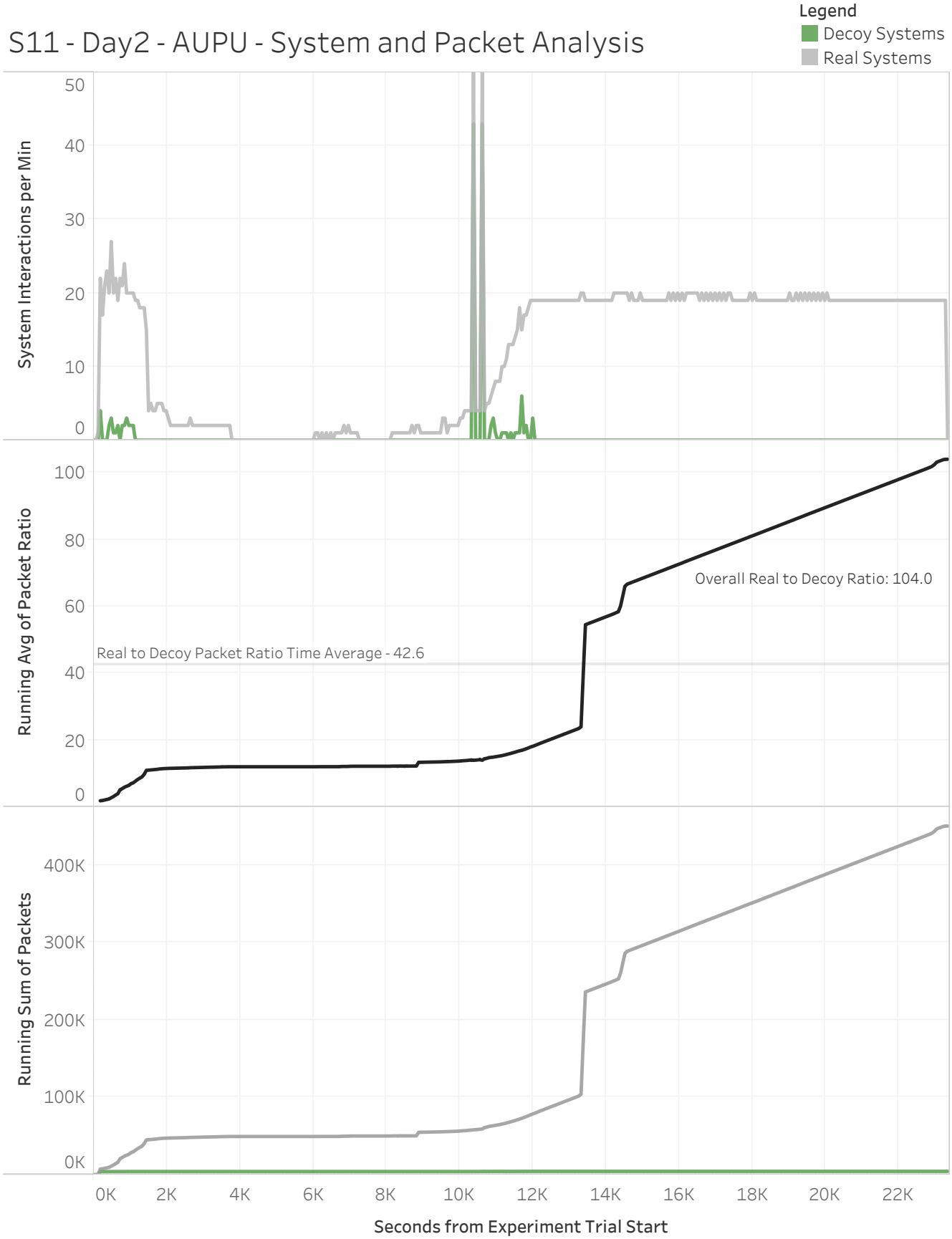
Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline



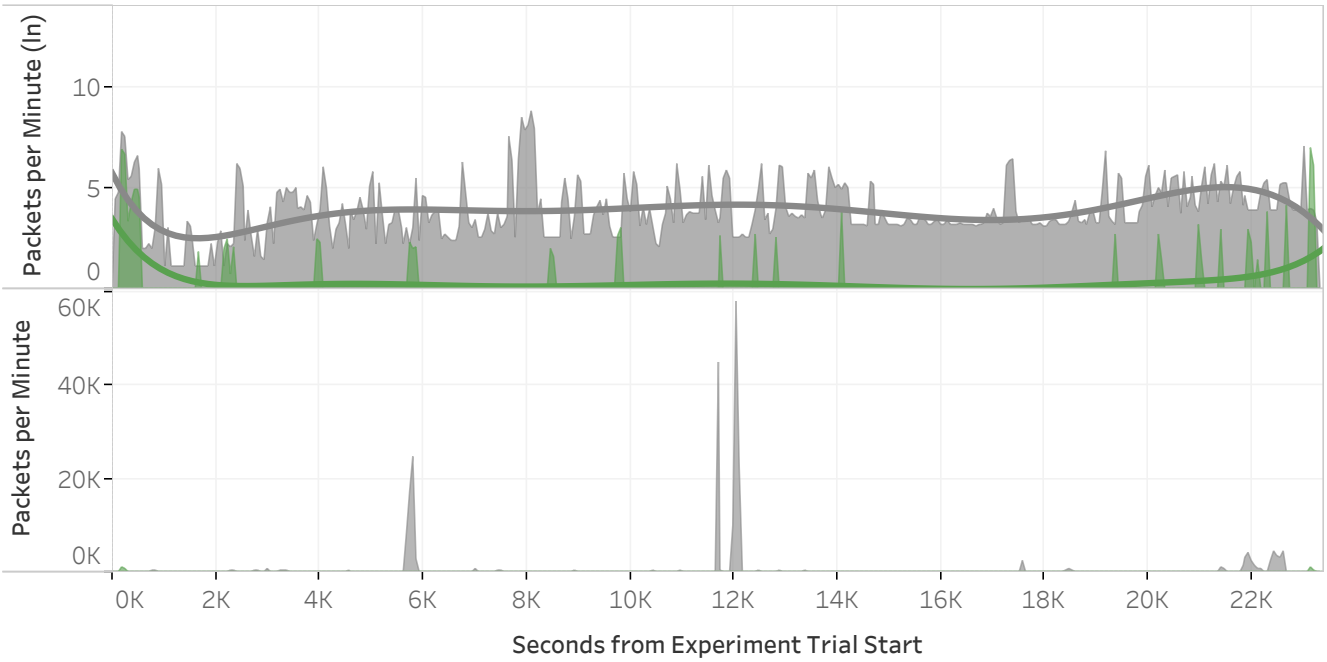
S11 - Day2 - AUPU - System and Packet Analysis



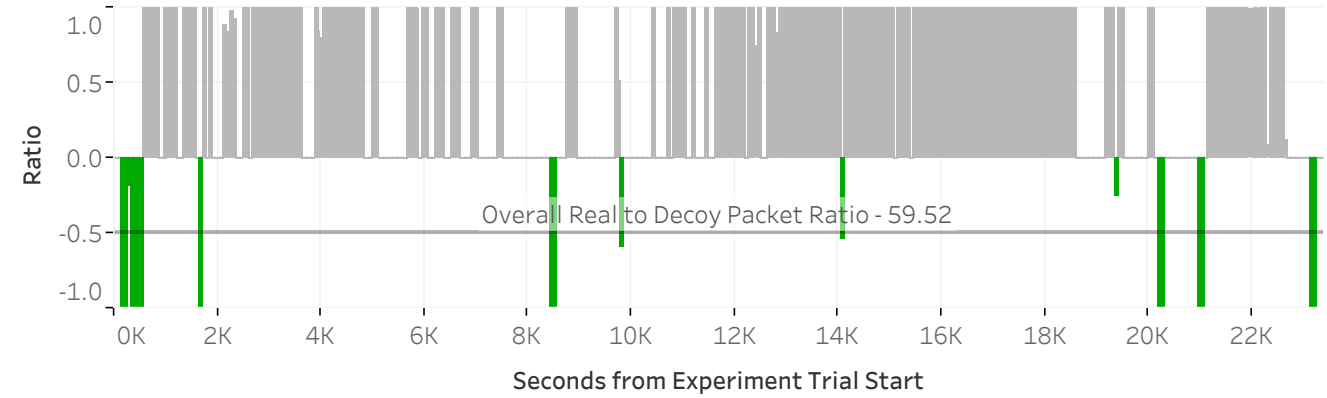
S12 - Day2 - AUPU

Legend
Real Systems
Decoy Systems

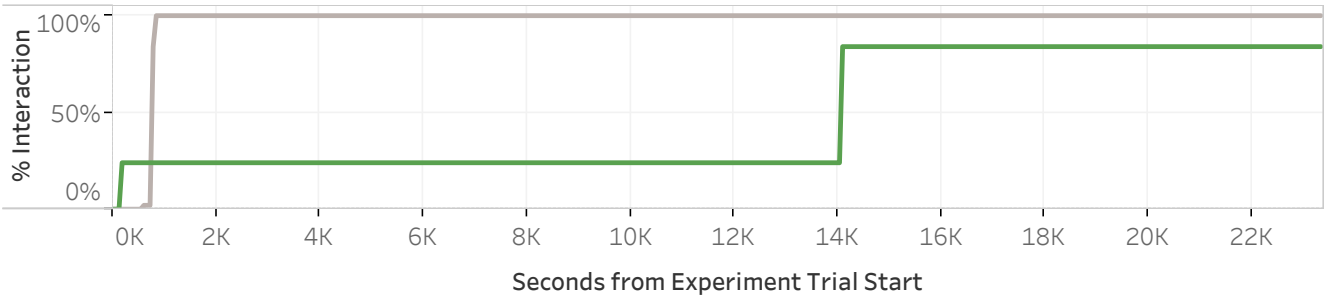
Real & Decoy Packets per Minute

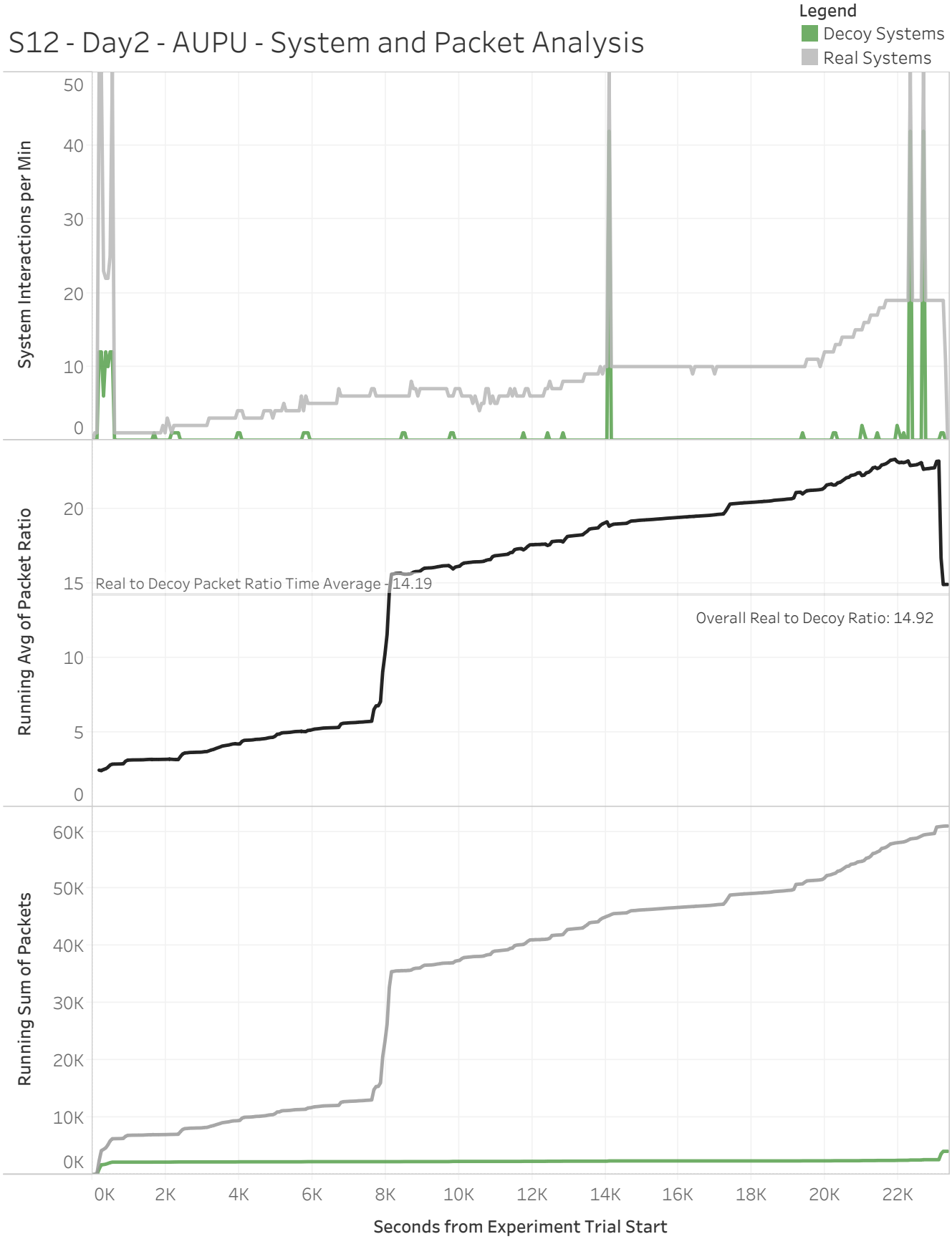


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

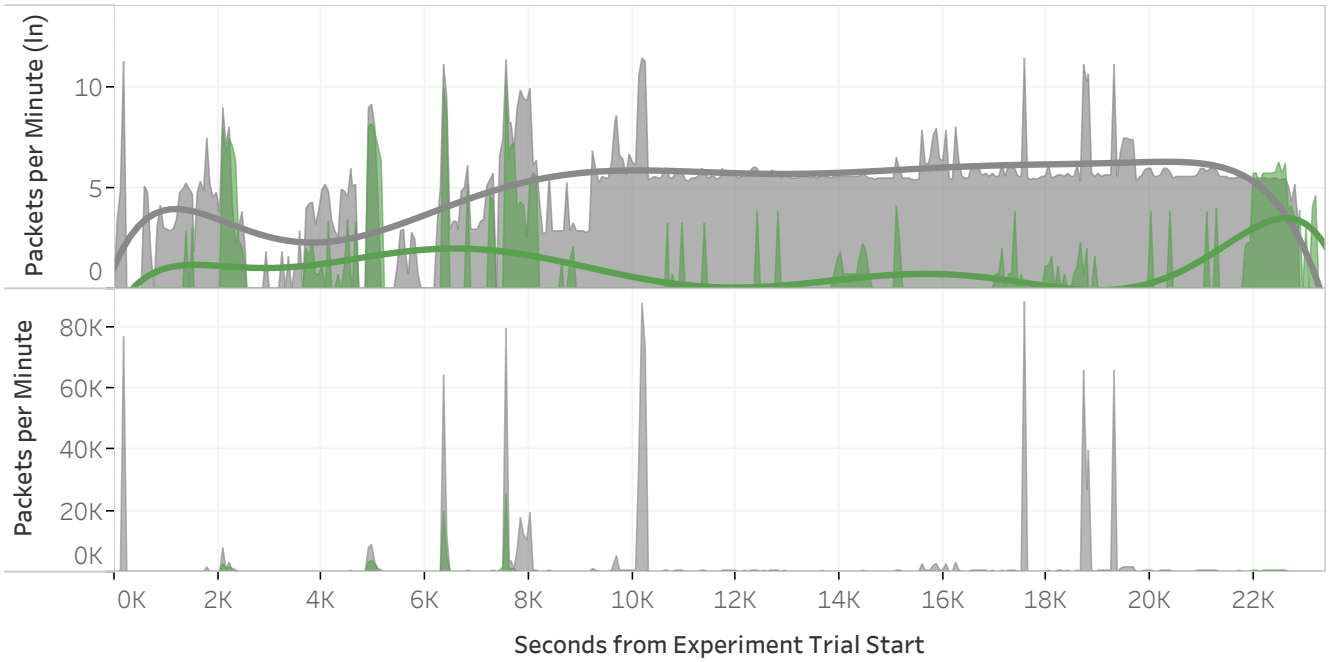



S12 - Day2 - AUPU - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
20
15
10
5
0
Real to Decoy Packet Ratio Time Average - 14.19
Overall Real to Decoy Ratio: 14.92
Running Sum of Packets
60K
50K
40K
30K
20K
10K
0K
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

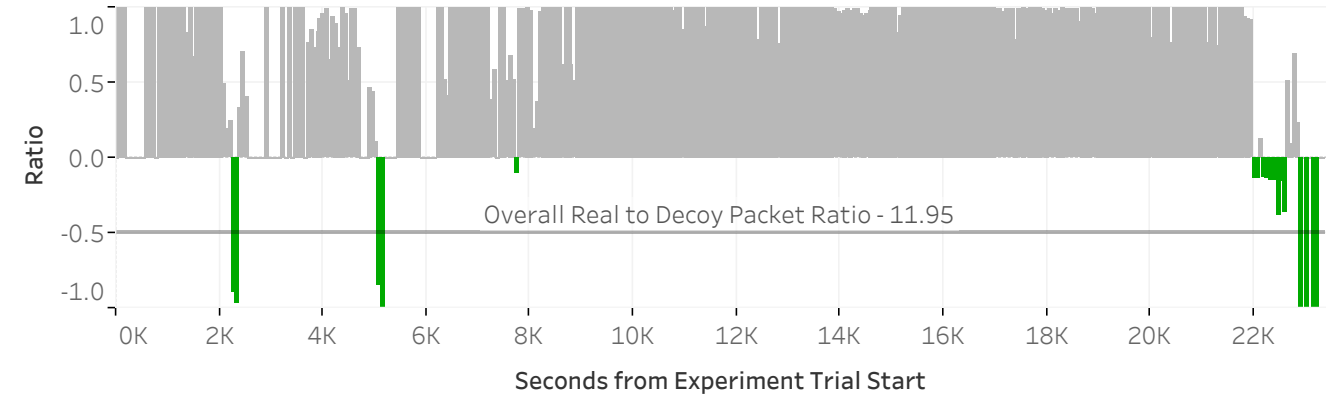
S13 - Day2 - AUPU

Legend
Real Systems
Decoy Systems

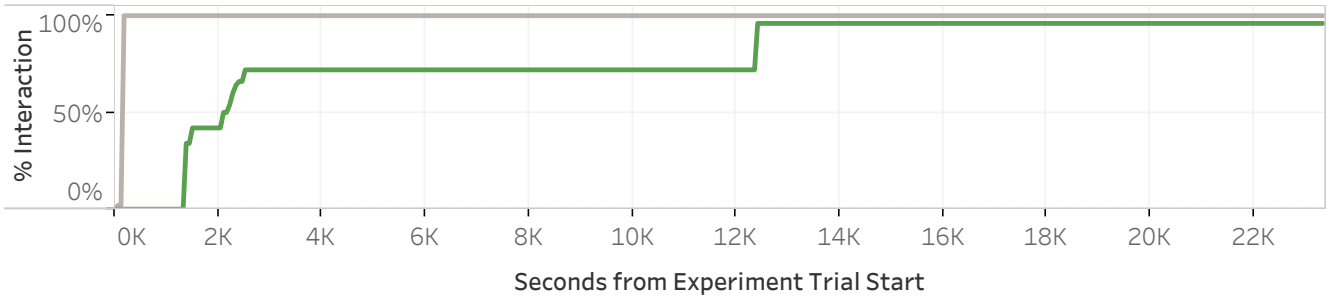
Real & Decoy Packets per Minute

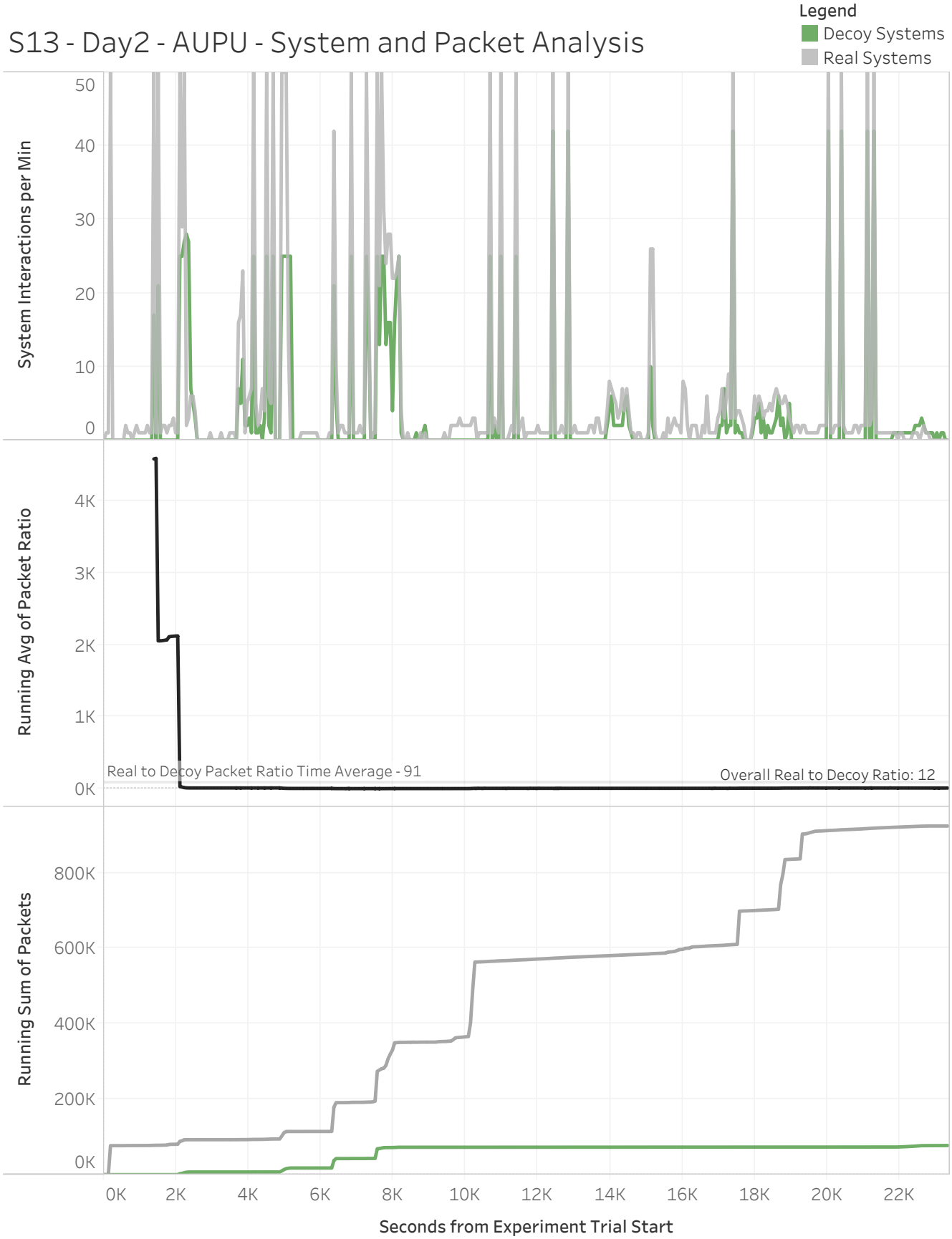


Real to Decoy Packet Ratio



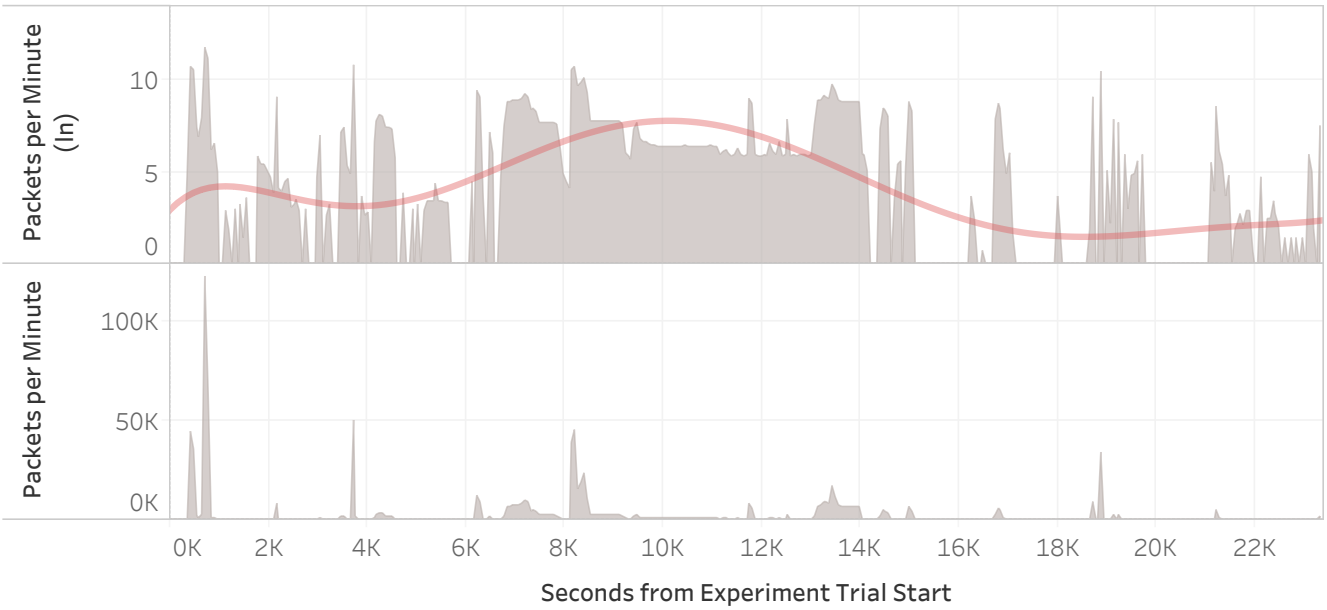
Real & Decoy System Interaction Timeline



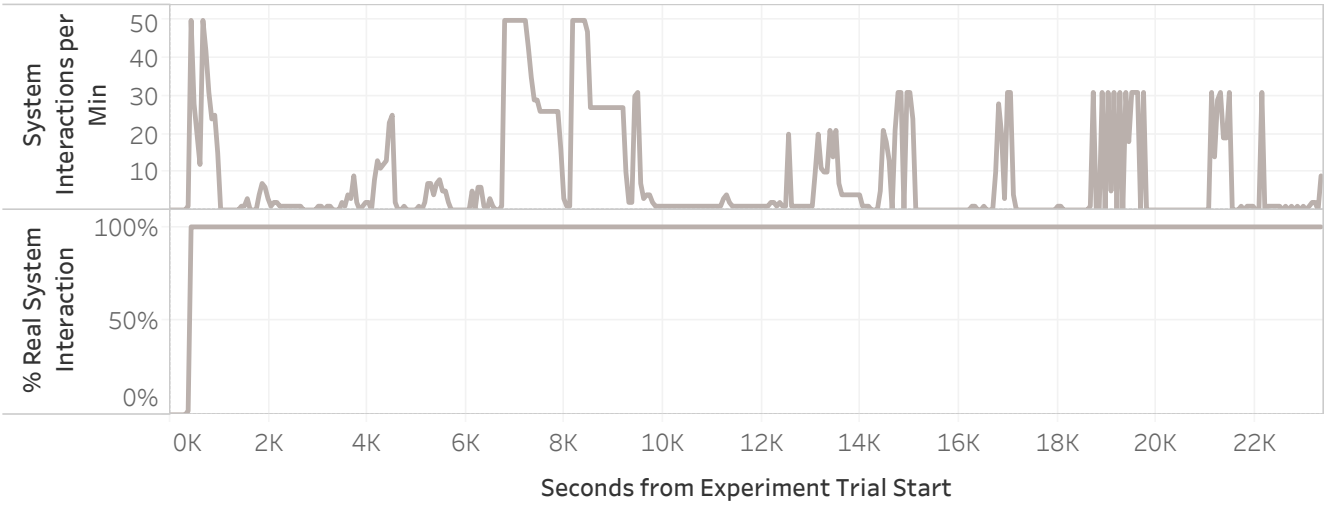

S13 - Day2 - AUPU - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
4K
3K
2K
1K
0K
Real to Decoy Packet Ratio Time Average - 91
Overall Real to Decoy Ratio: 12
Running Sum of Packets
800K
600K
400K
200K
0K
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

S14 - Day 2 - PUAU

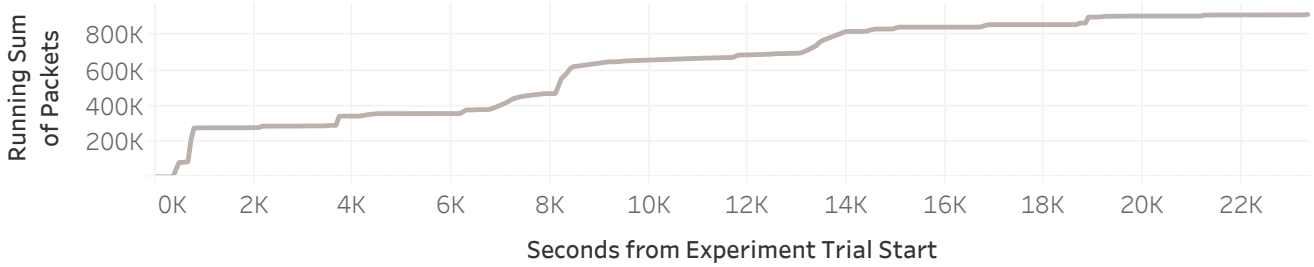
Real Packets per Minute



Real System Interaction Timeline

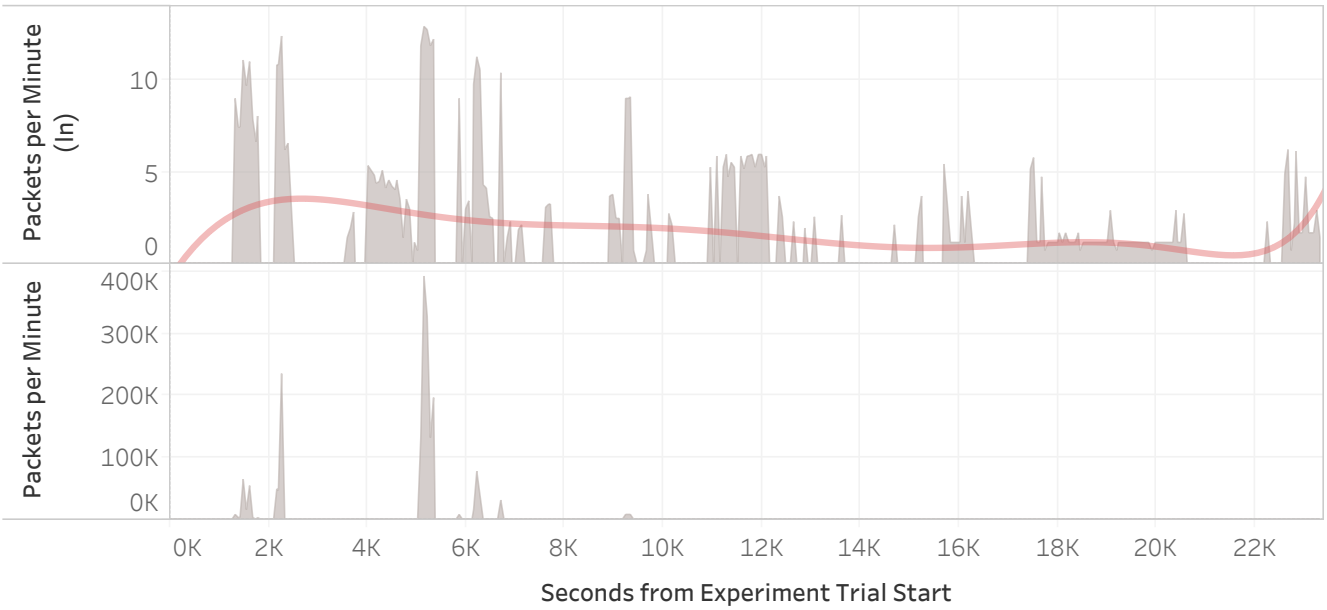


Running Sum of Packets

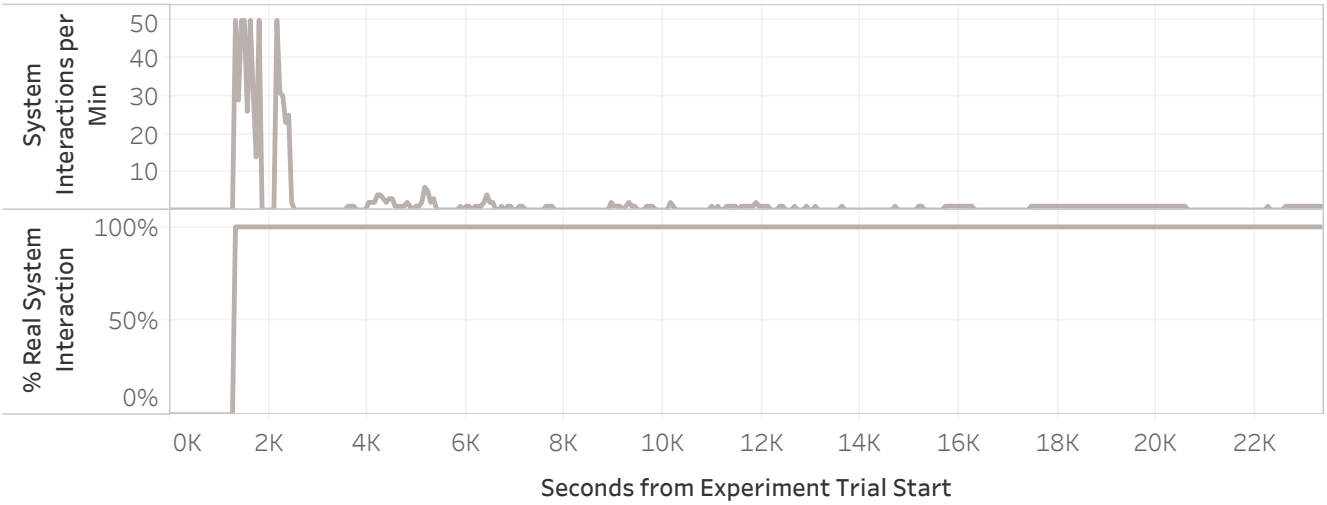


S16 - Day 2 - PUAU

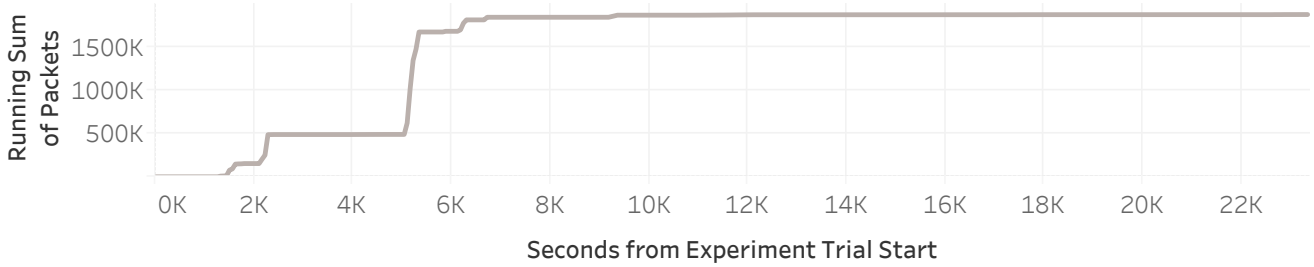
Real Packets per Minute



Real System Interaction Timeline

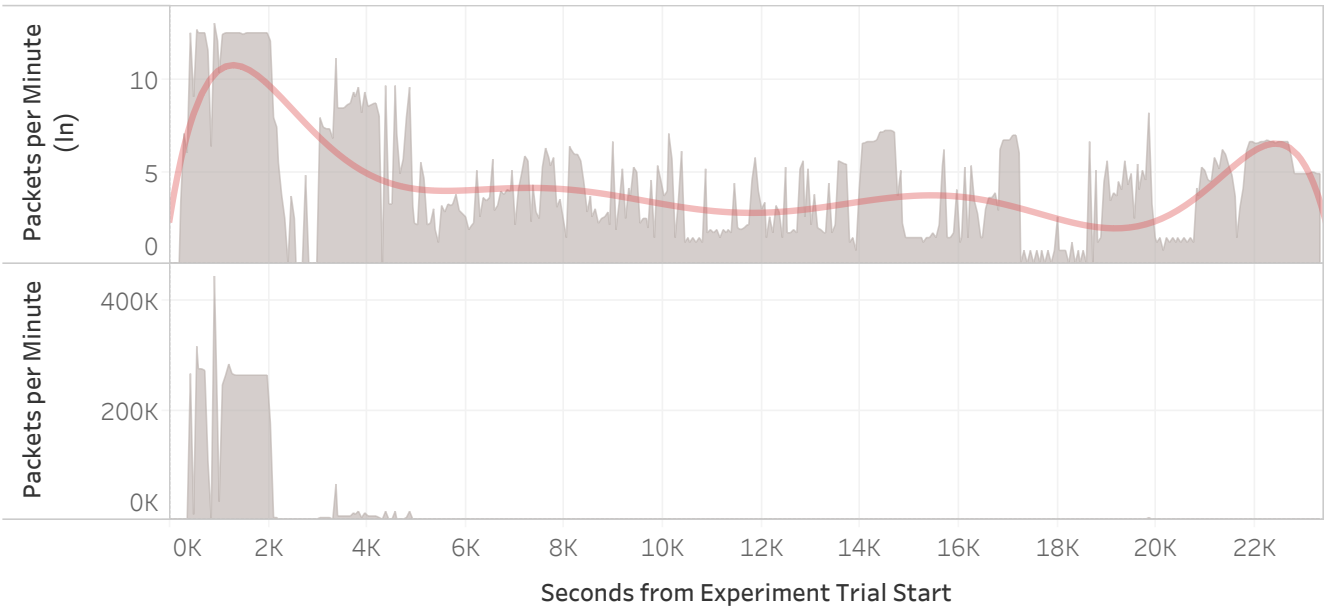


Running Sum of Packets

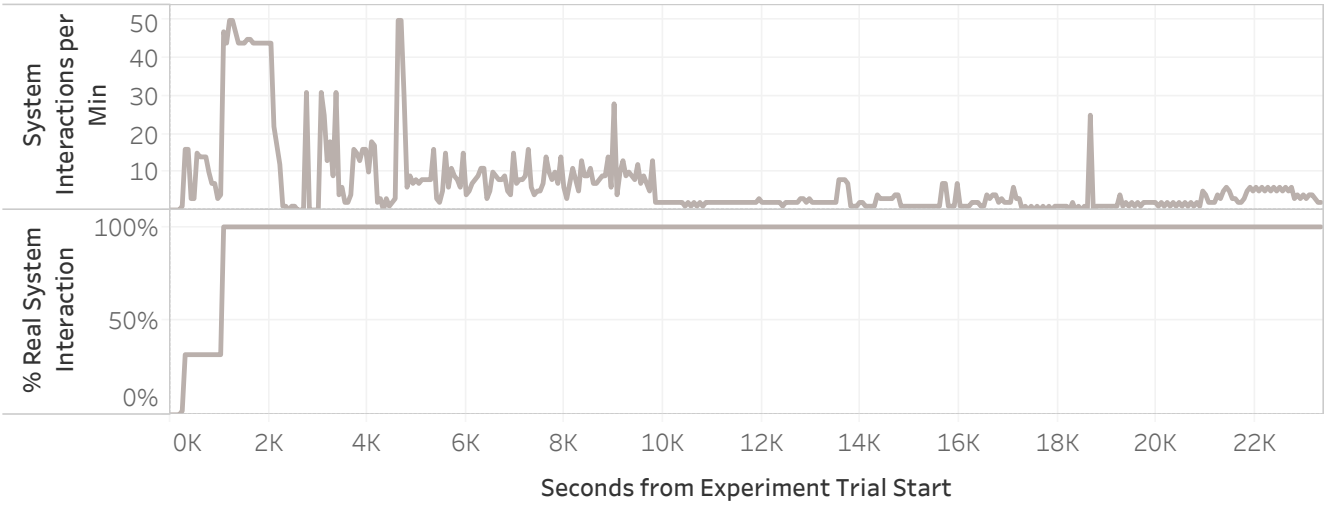


S17 - Day 2 - PUAU

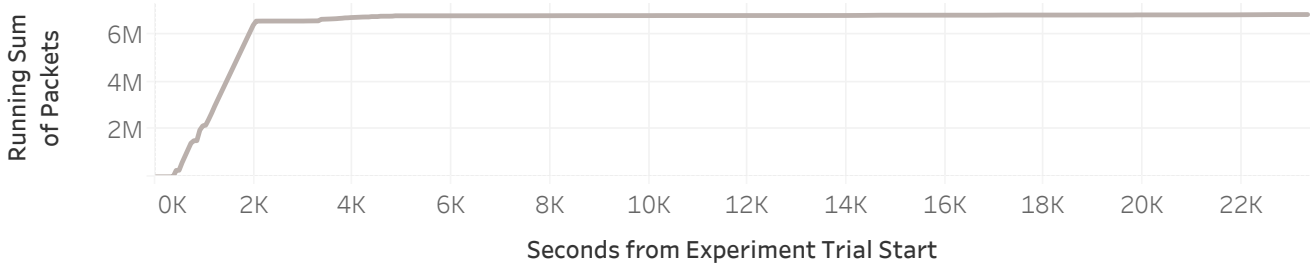
Real Packets per Minute



Real System Interaction Timeline

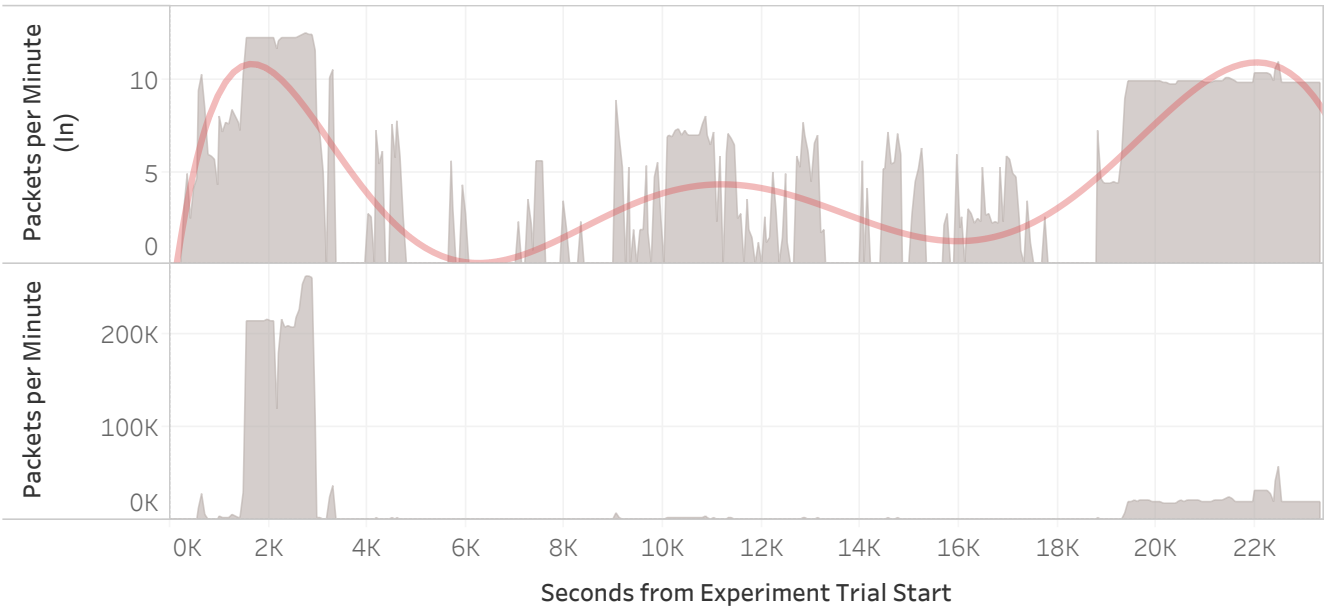


Running Sum of Packets

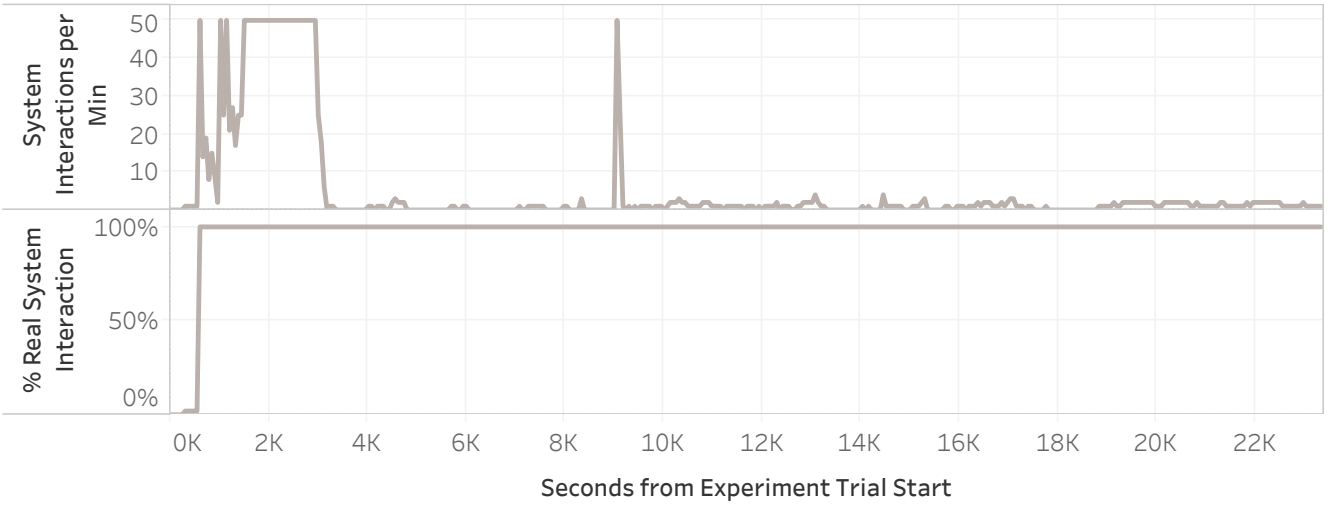


S19 - Day 2 - PUAU

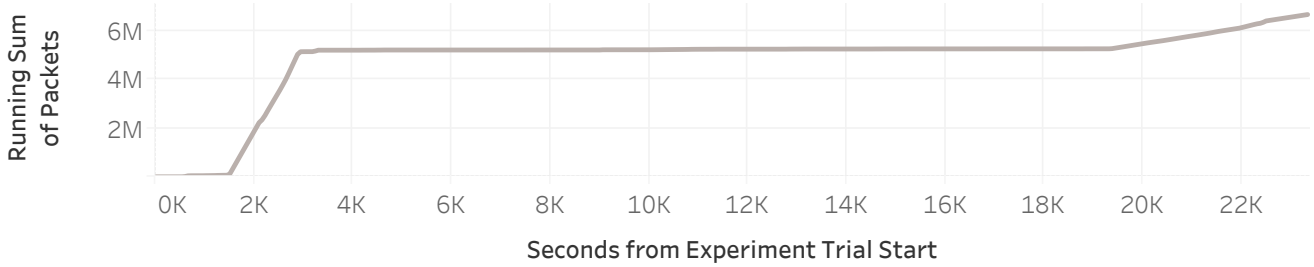
Real Packets per Minute



Real System Interaction Timeline

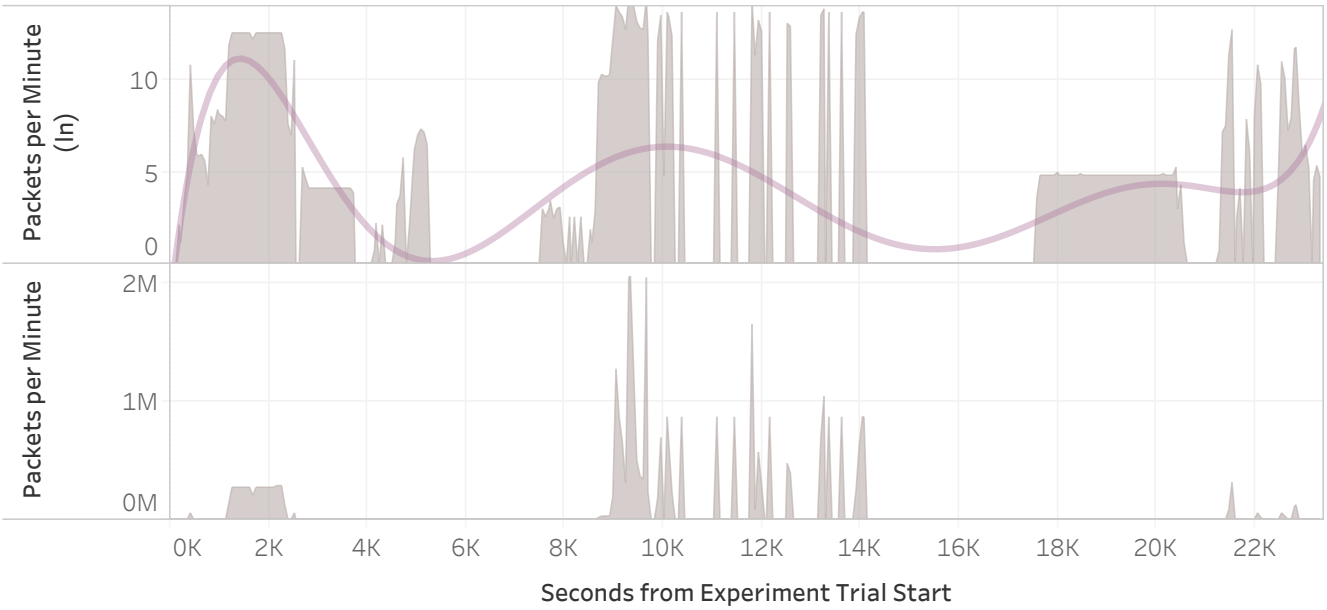


Running Sum of Packets

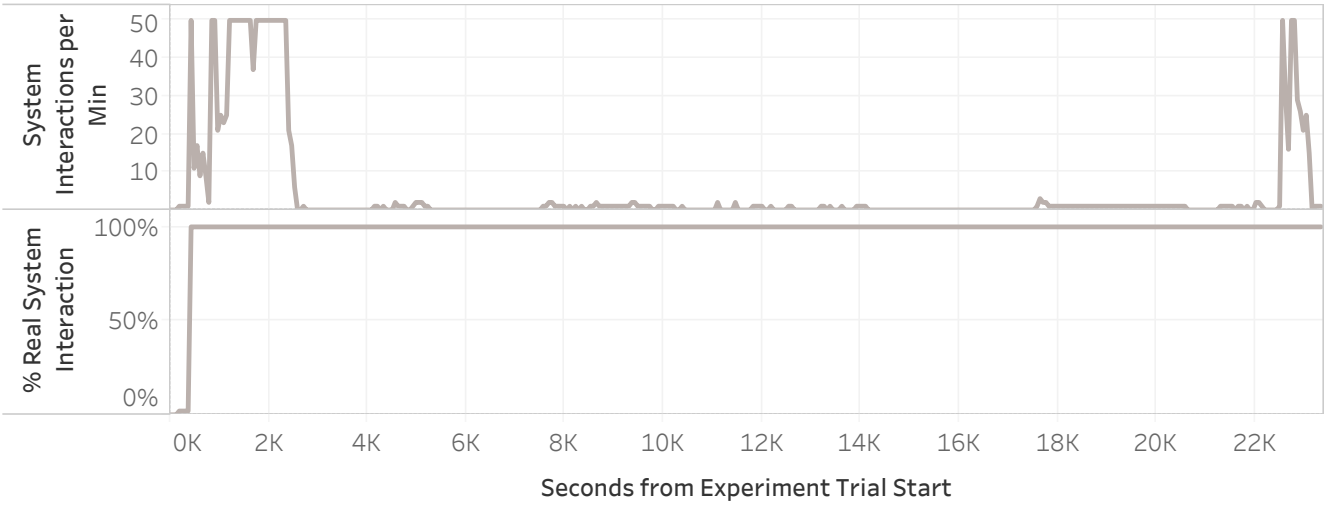


S20 - Day 2 - PIAU

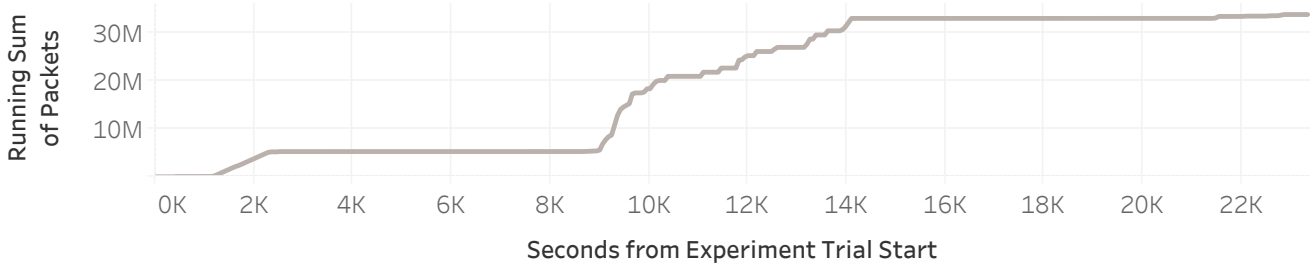
Real Packets per Minute



Real System Interaction Timeline

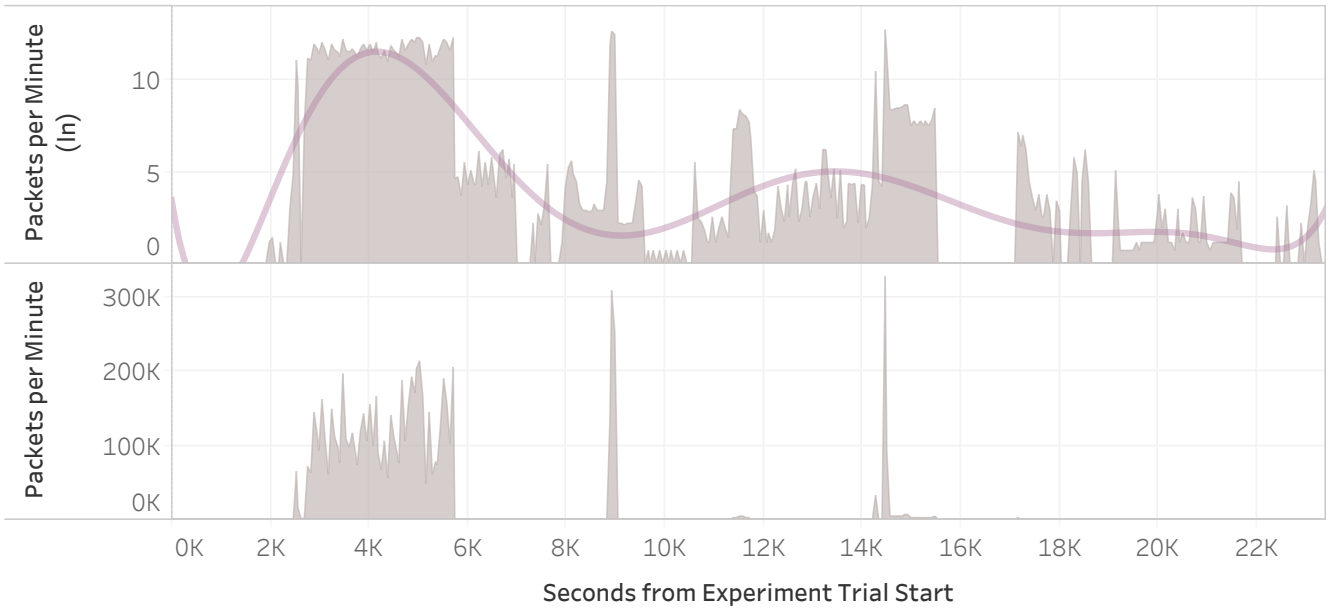


Running Sum of Packets

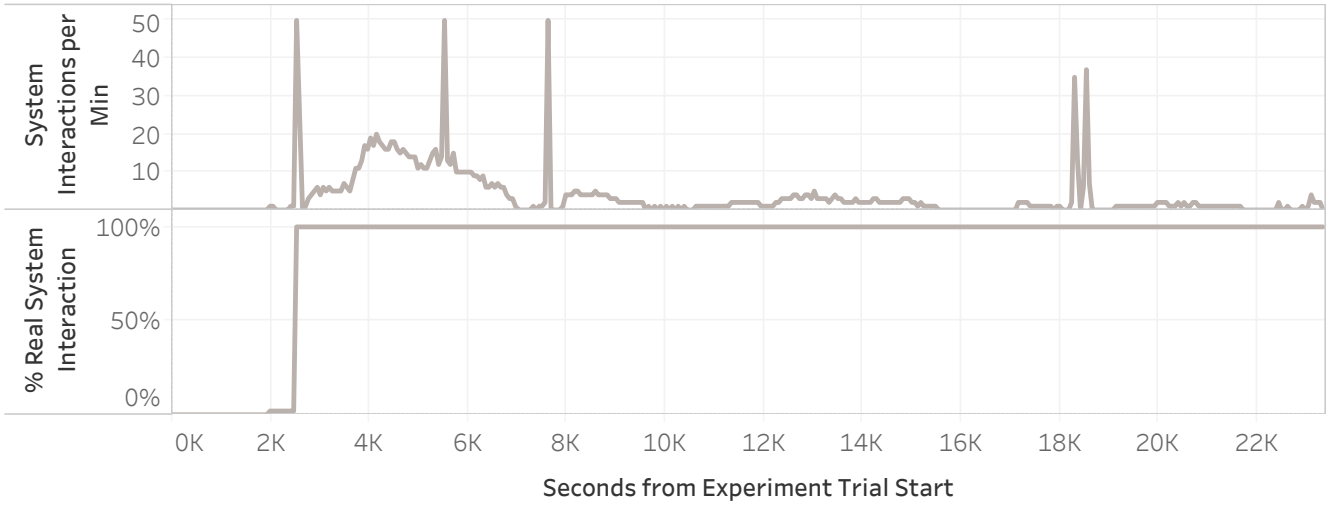


S21 - Day 2 - PIAU

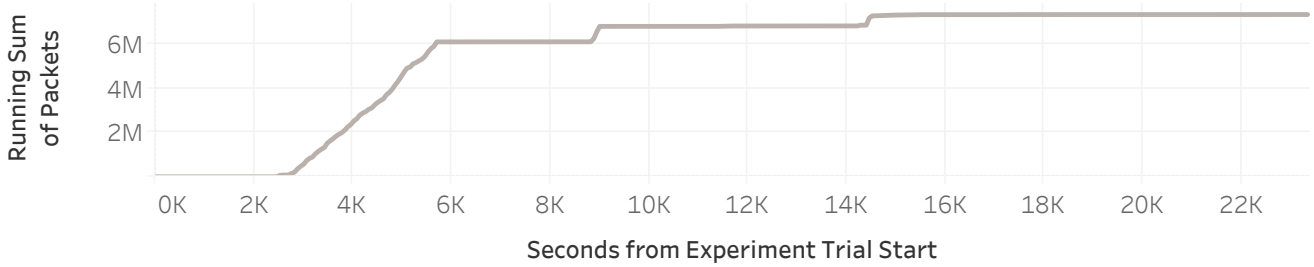
Real Packets per Minute



Real System Interaction Timeline

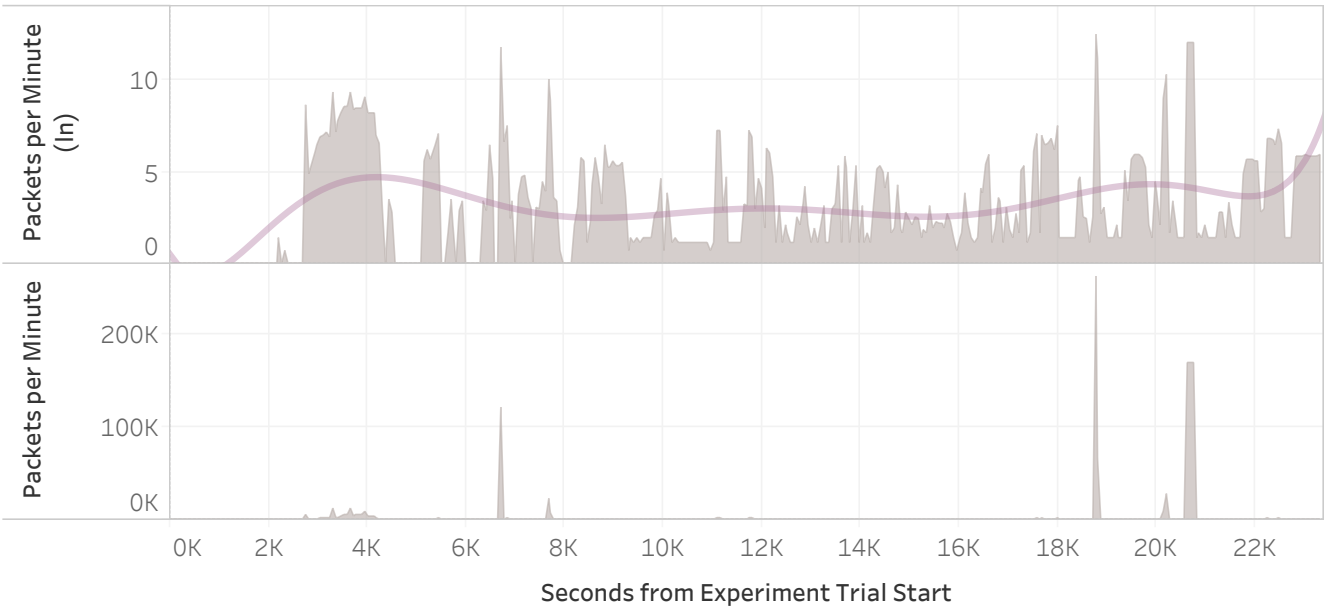


Running Sum of Packets

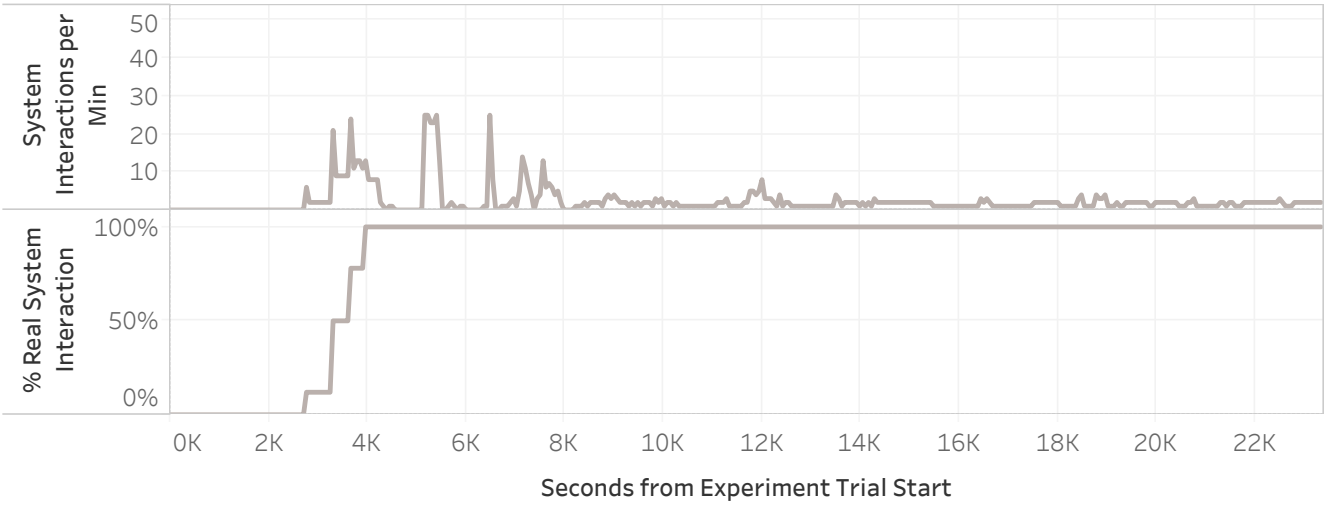


S22 - Day 2 - PIAU

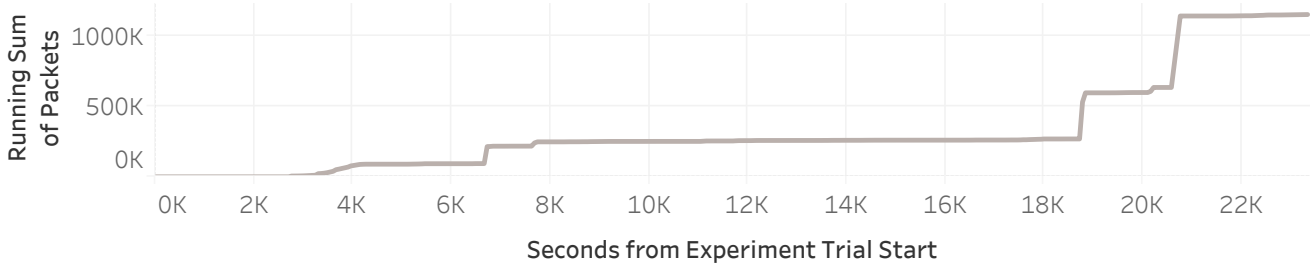
Real Packets per Minute



Real System Interaction Timeline

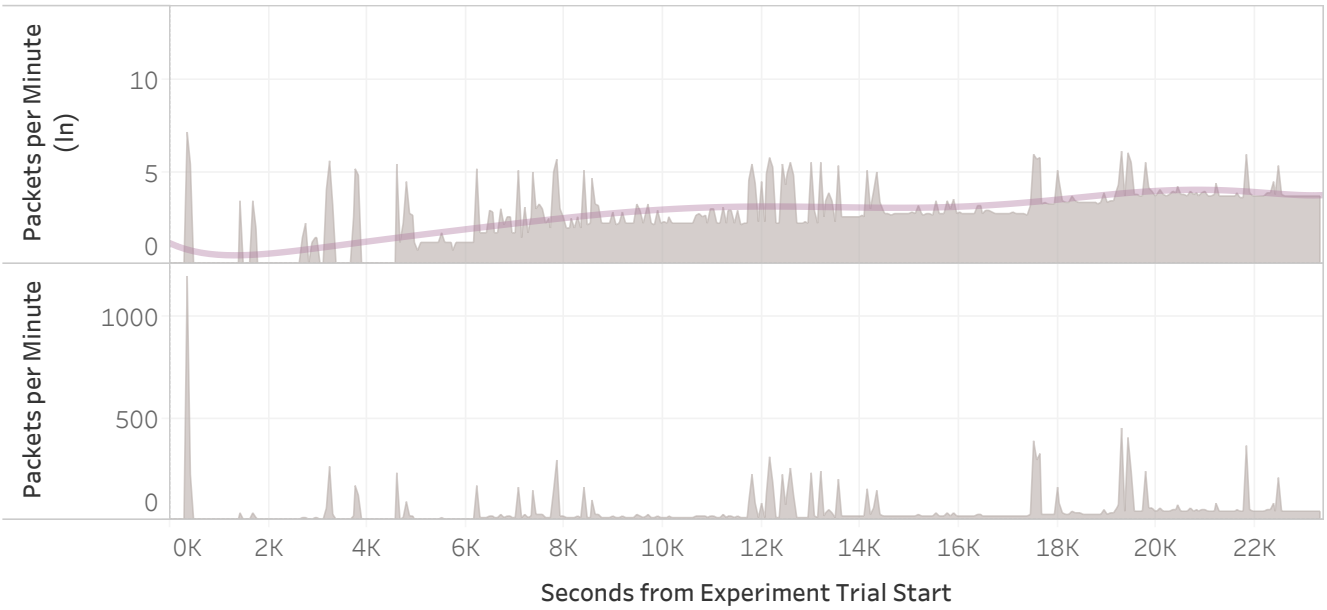


Running Sum of Packets

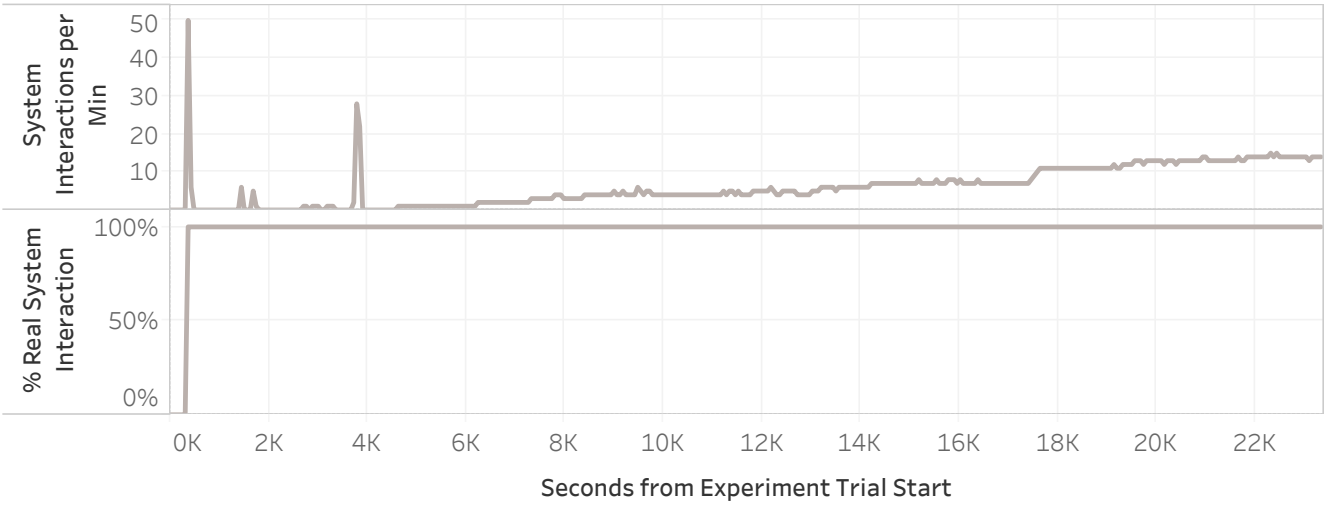


S23 - Day 2 - PIAU

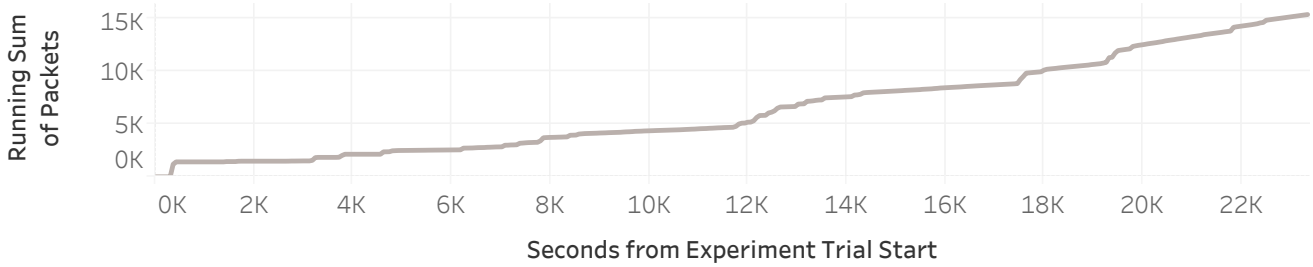
Real Packets per Minute



Real System Interaction Timeline

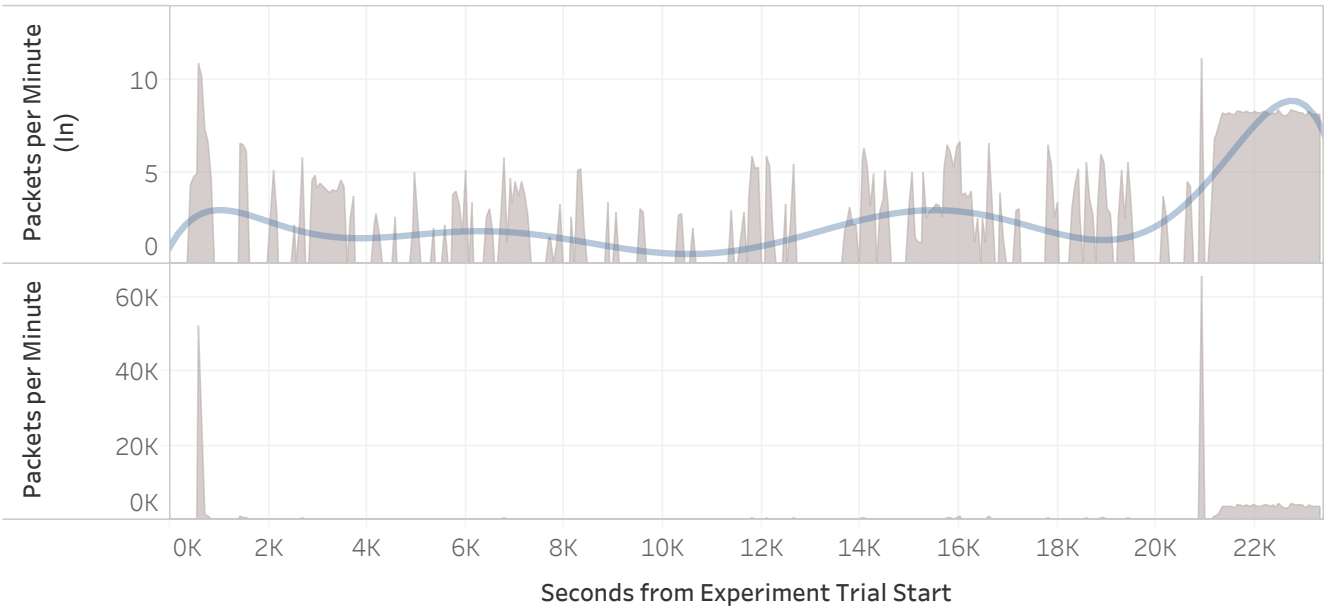


Running Sum of Packets

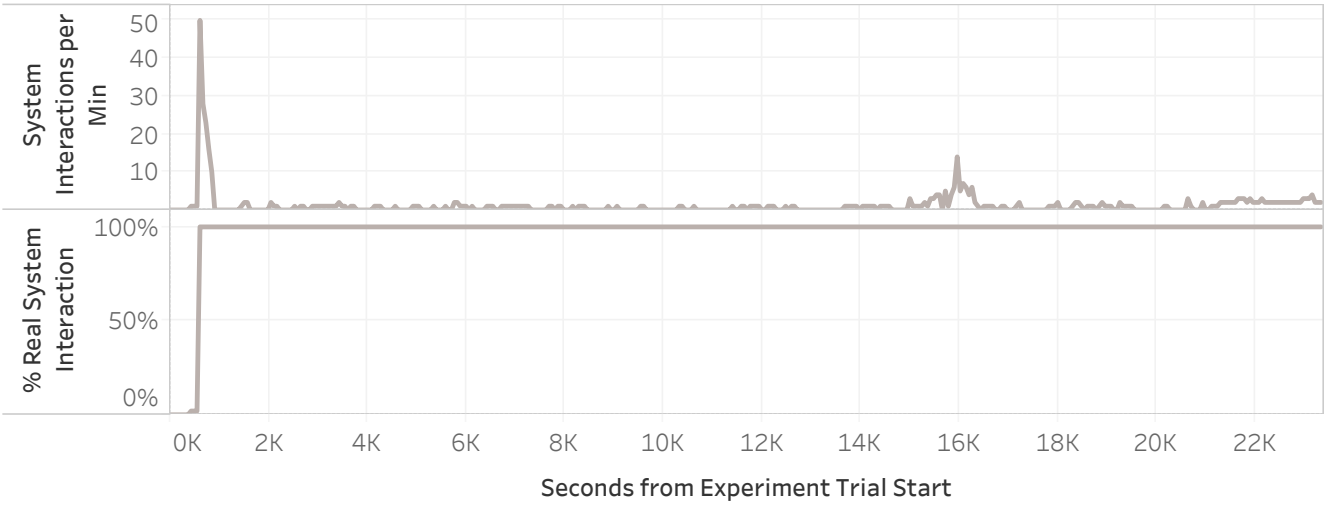


S27 - Day 2 - AIAU

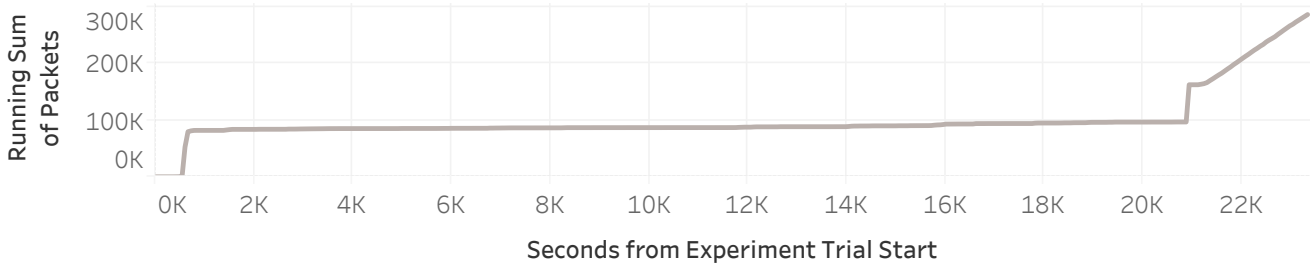
Real Packets per Minute



Real System Interaction Timeline

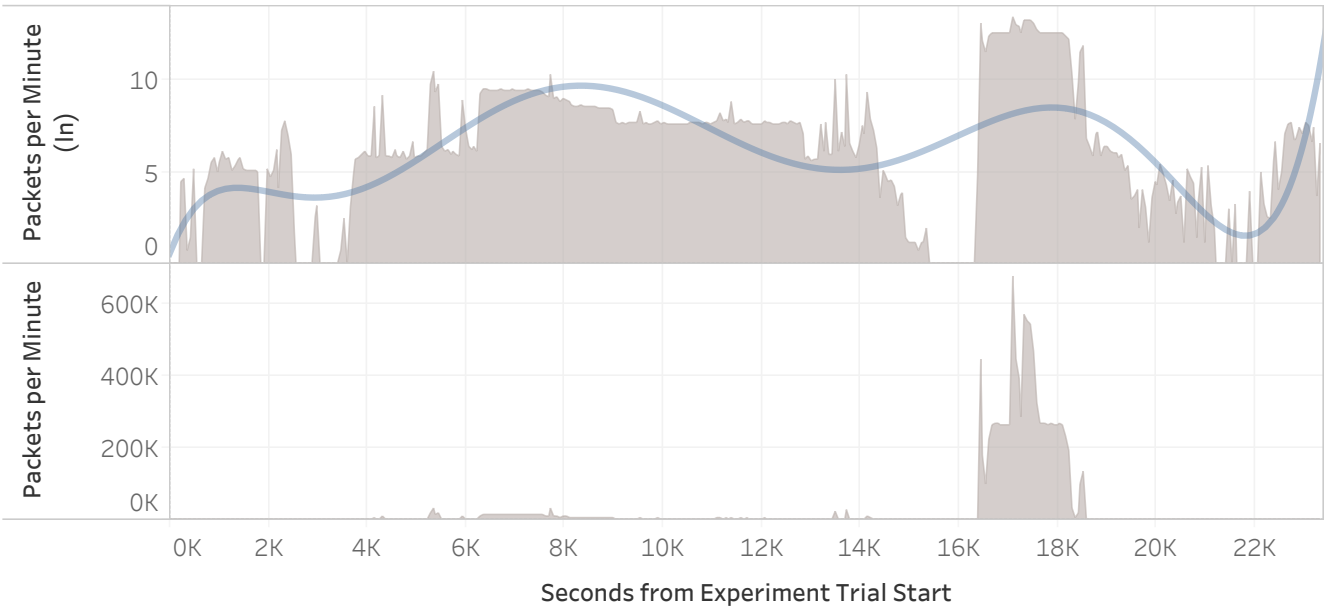


Running Sum of Packets

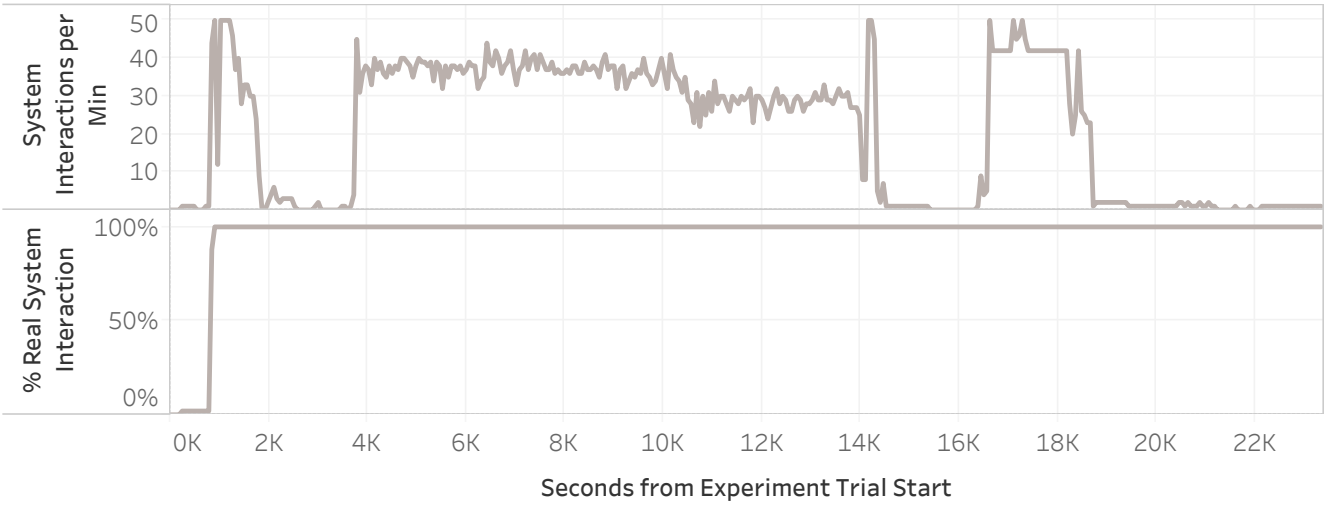


S29 - Day 2 - AIAU

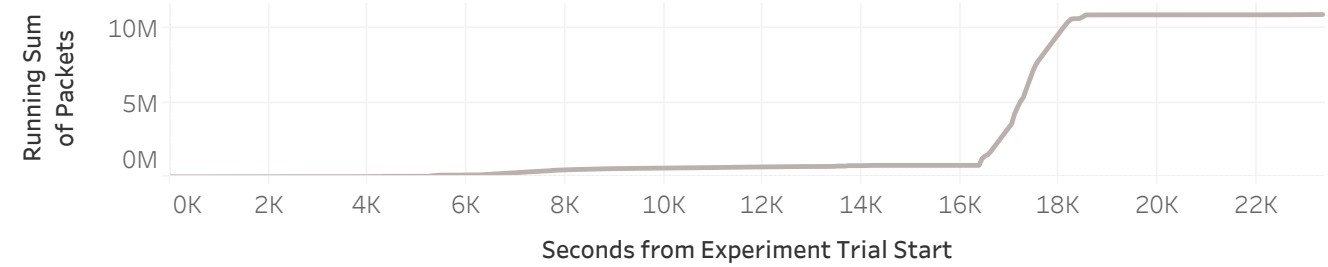
Real Packets per Minute



Real System Interaction Timeline

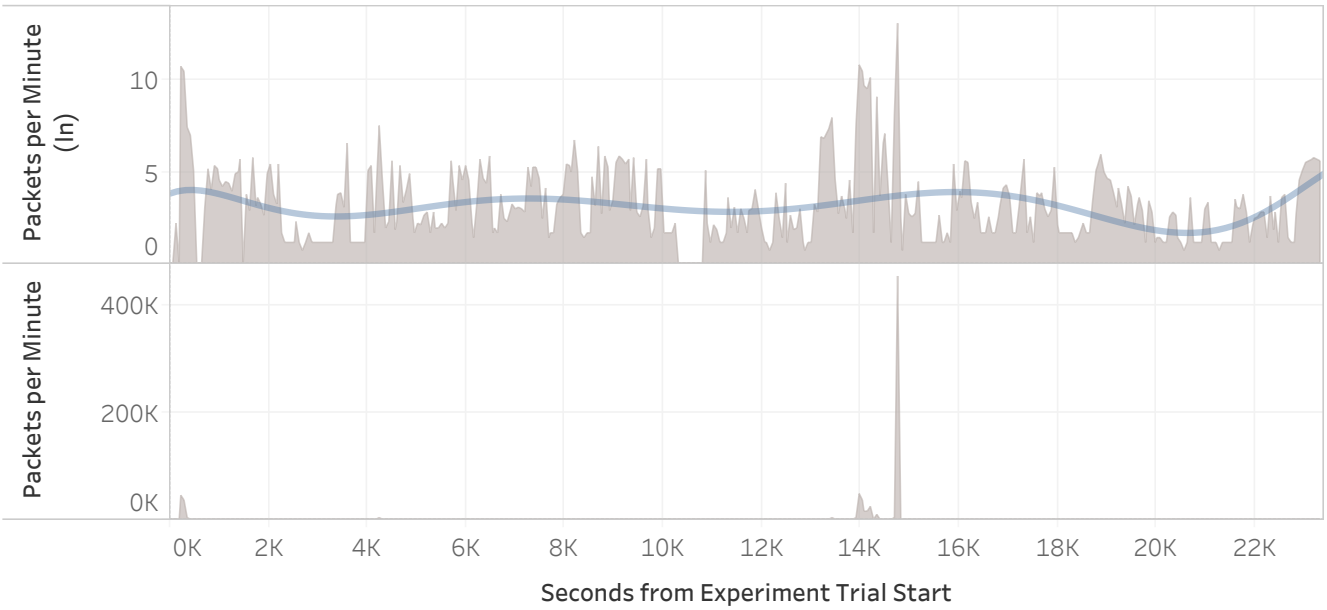


Running Sum of Packets

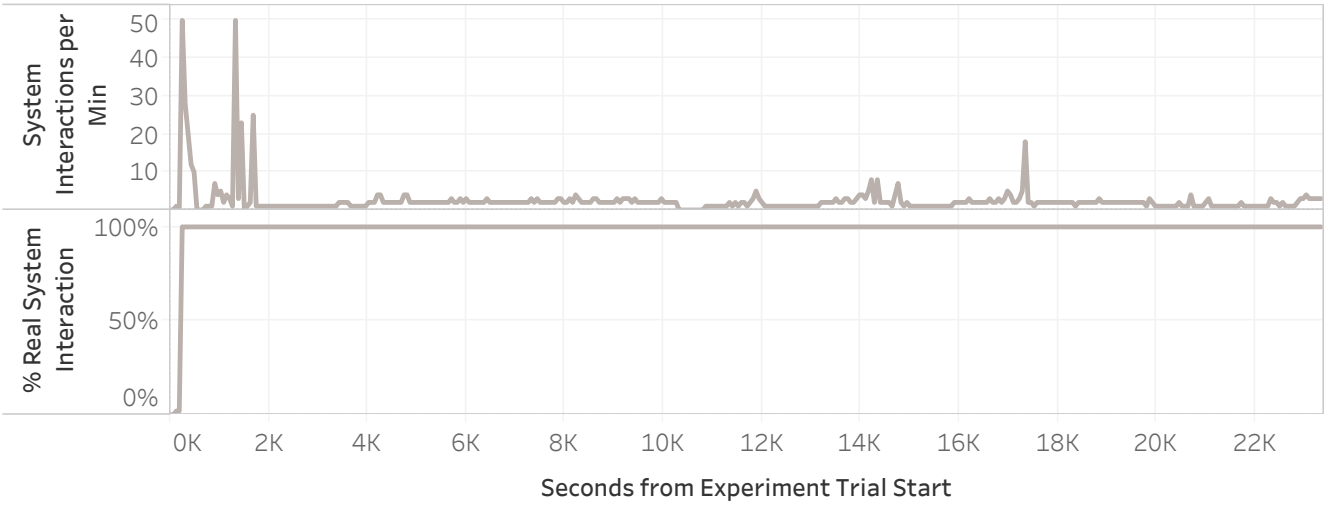


S30 - Day 2 - AIAU

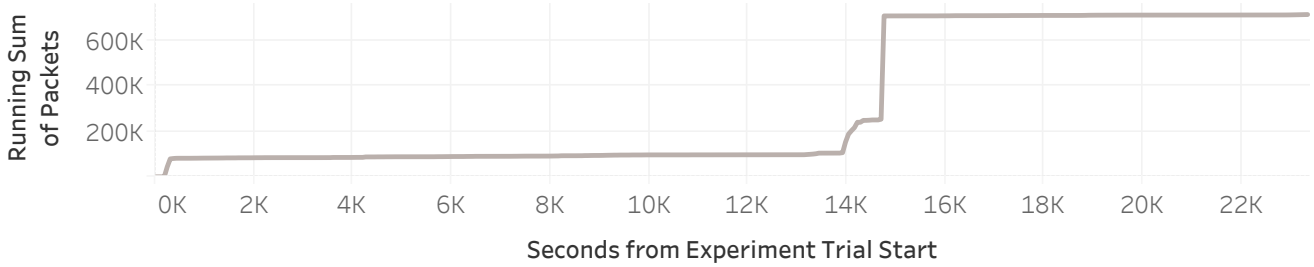
Real Packets per Minute



Real System Interaction Timeline

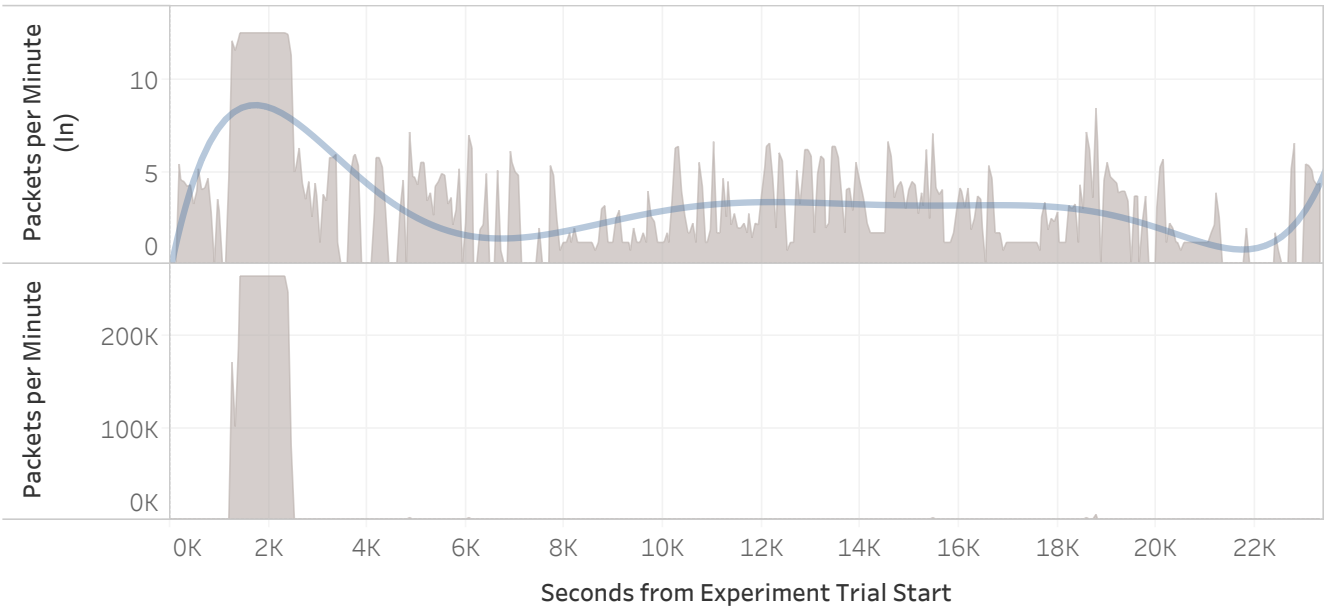


Running Sum of Packets

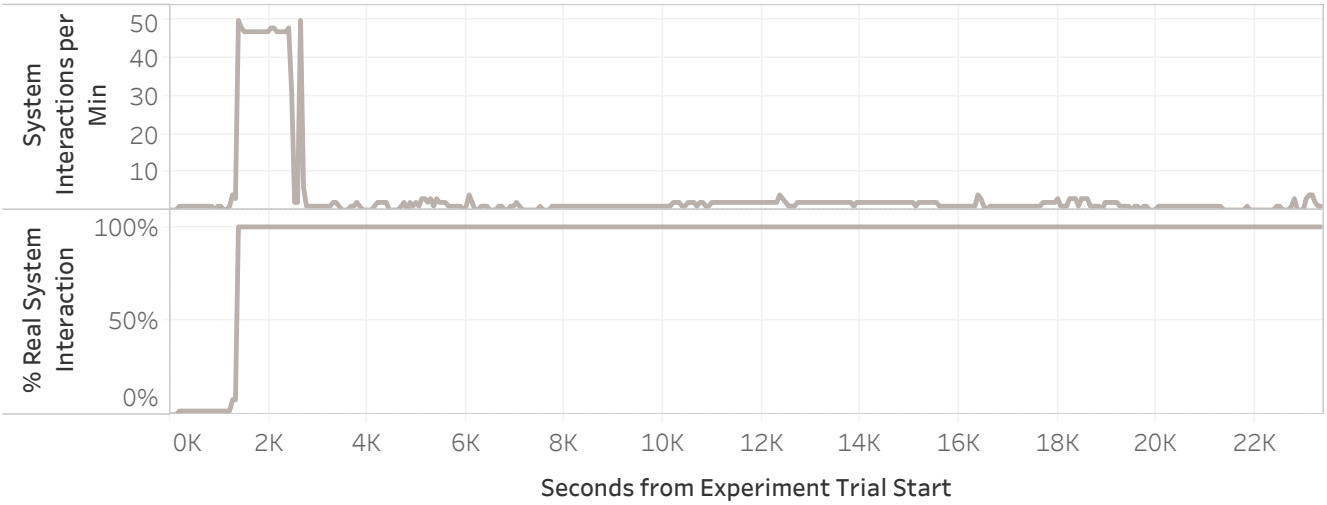


S31 - Day 2 - AIAU

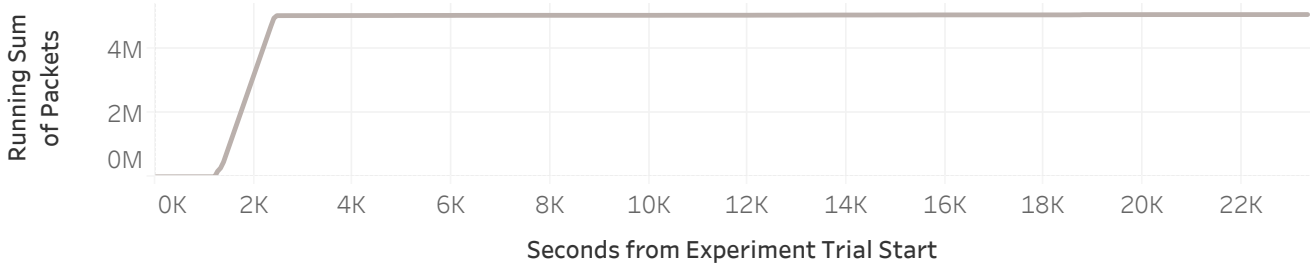
Real Packets per Minute



Real System Interaction Timeline

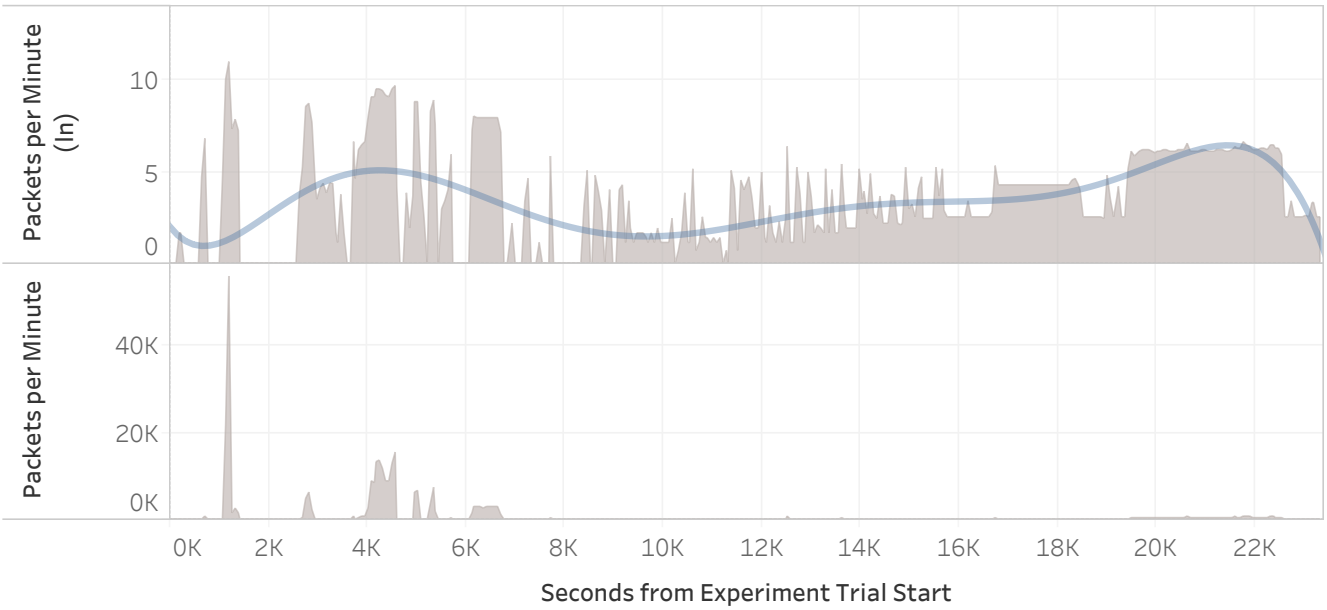


Running Sum of Packets

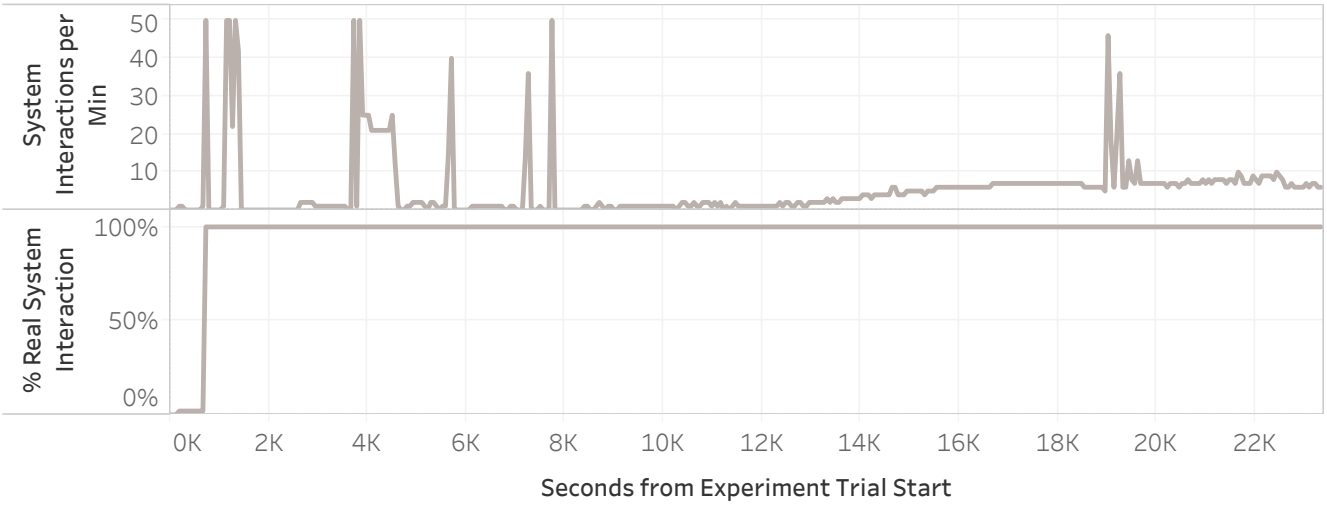


S32 - Day 2 - AIAU

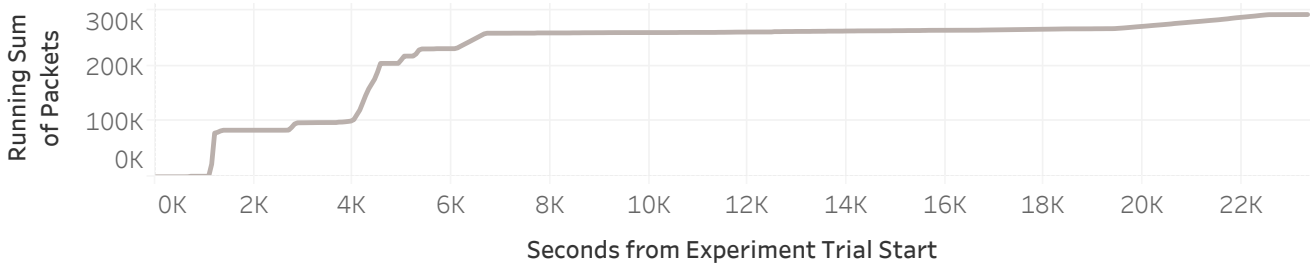
Real Packets per Minute



Real System Interaction Timeline

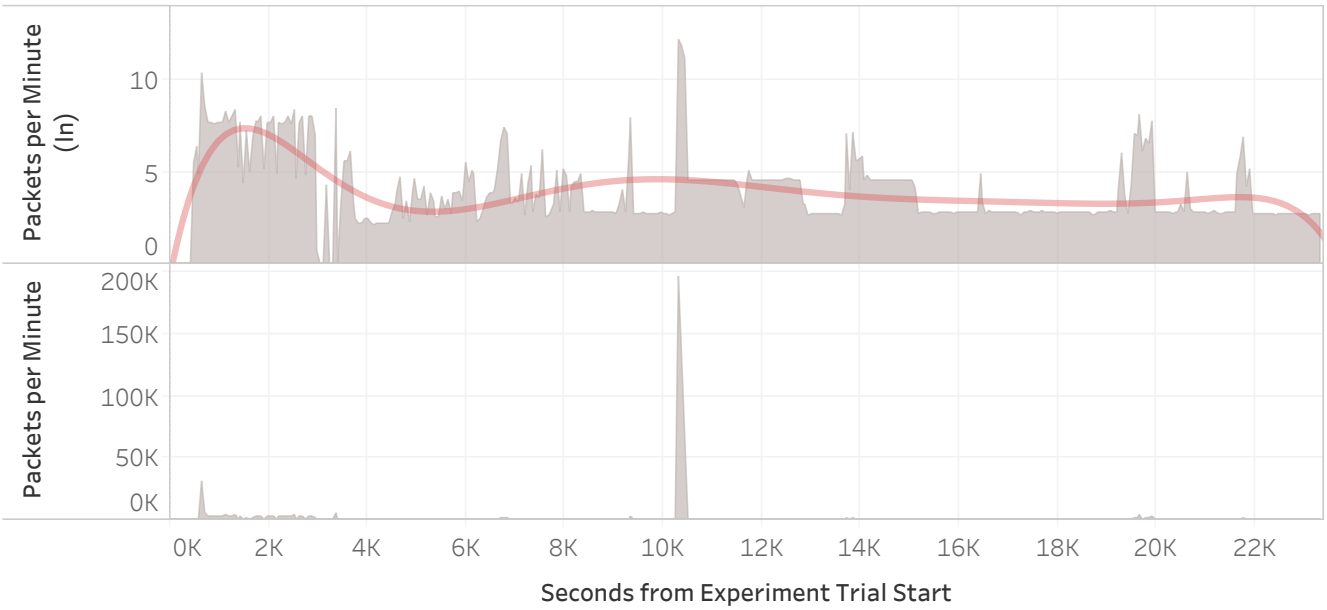


Running Sum of Packets

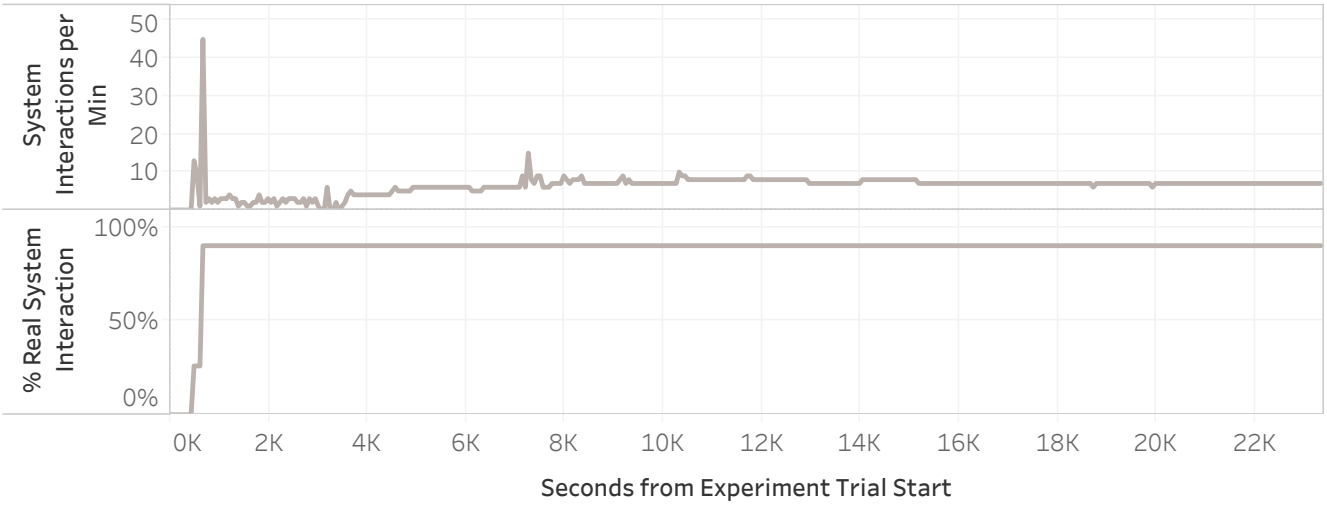


S43 - Day 2 - PUAU

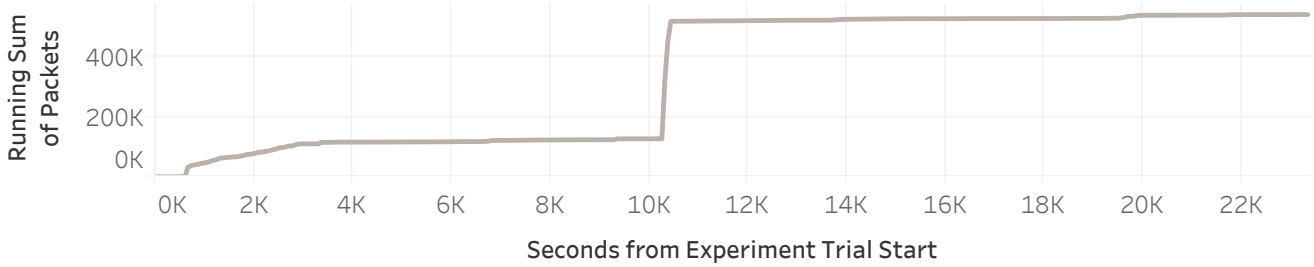
Real Packets per Minute



Real System Interaction Timeline

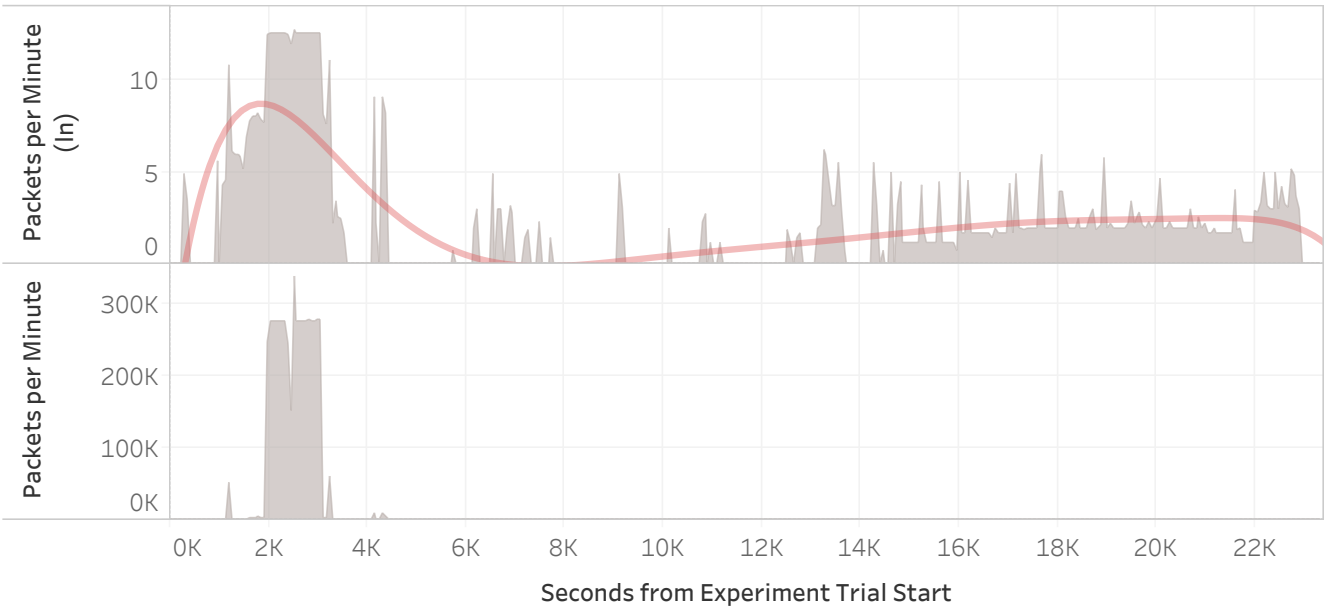


Running Sum of Packets

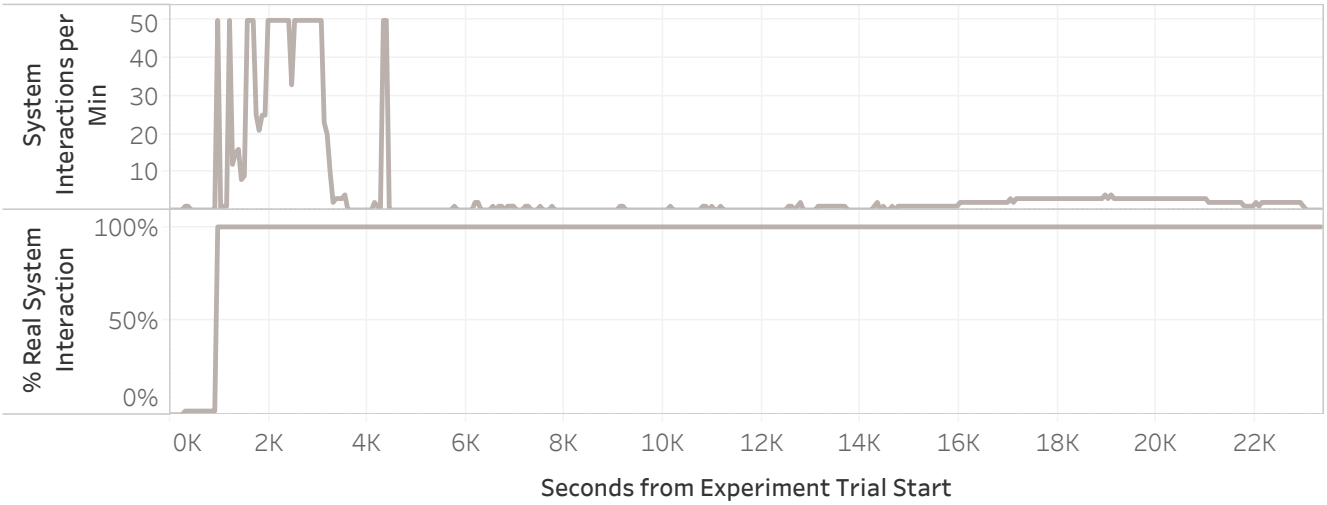


S44 - Day 2 - PUAU

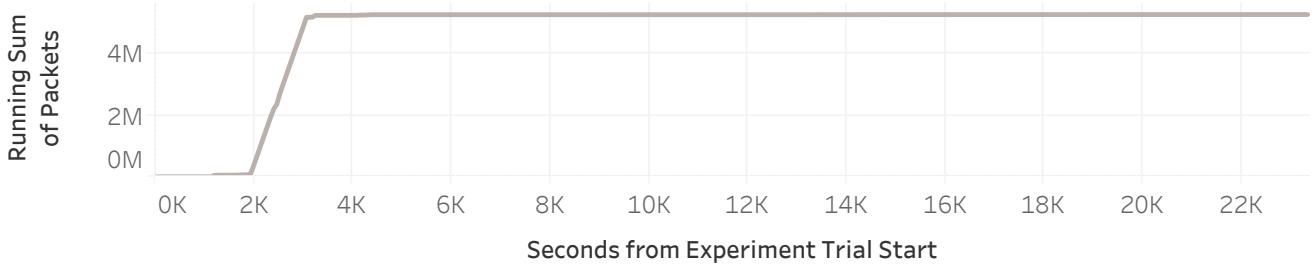
Real Packets per Minute



Real System Interaction Timeline

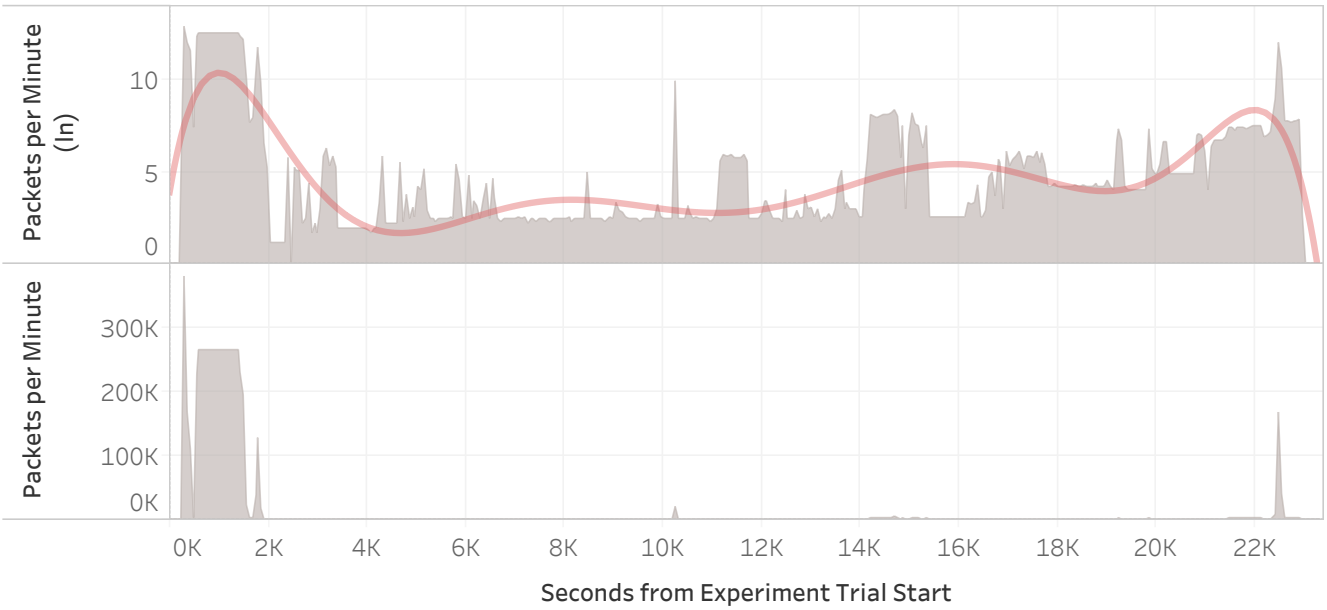


Running Sum of Packets

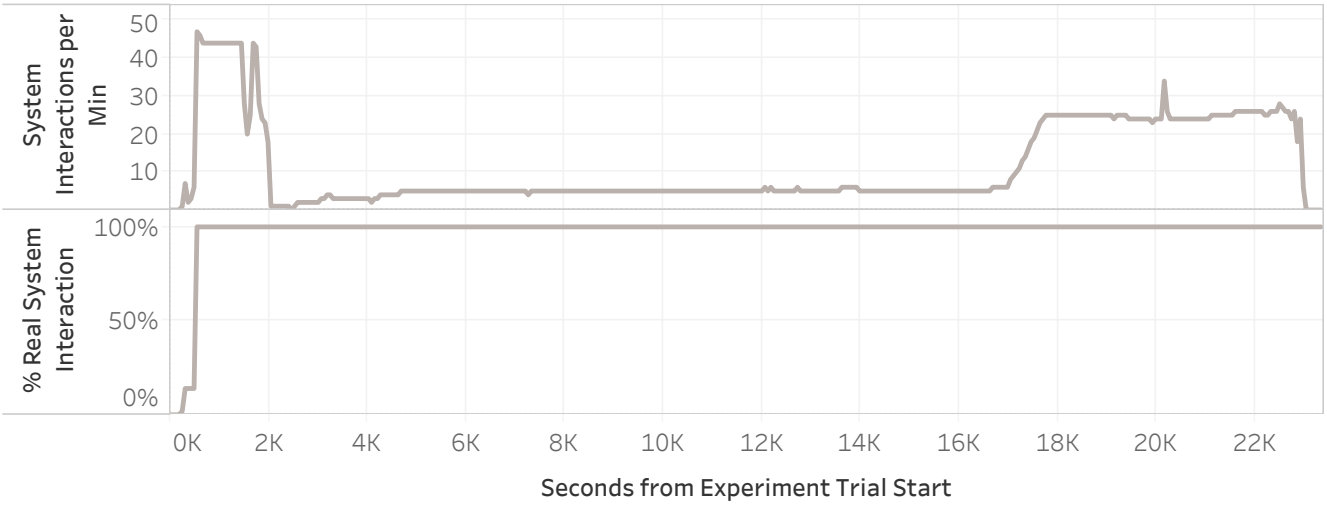


S45 - Day 2 - PUAU

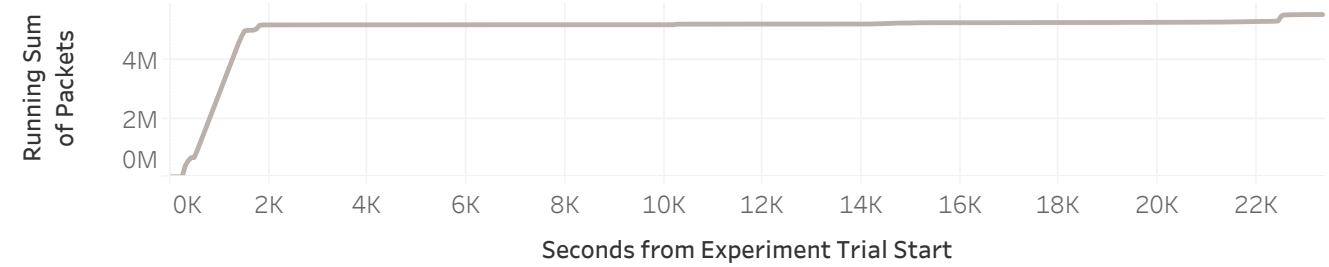
Real Packets per Minute



Real System Interaction Timeline

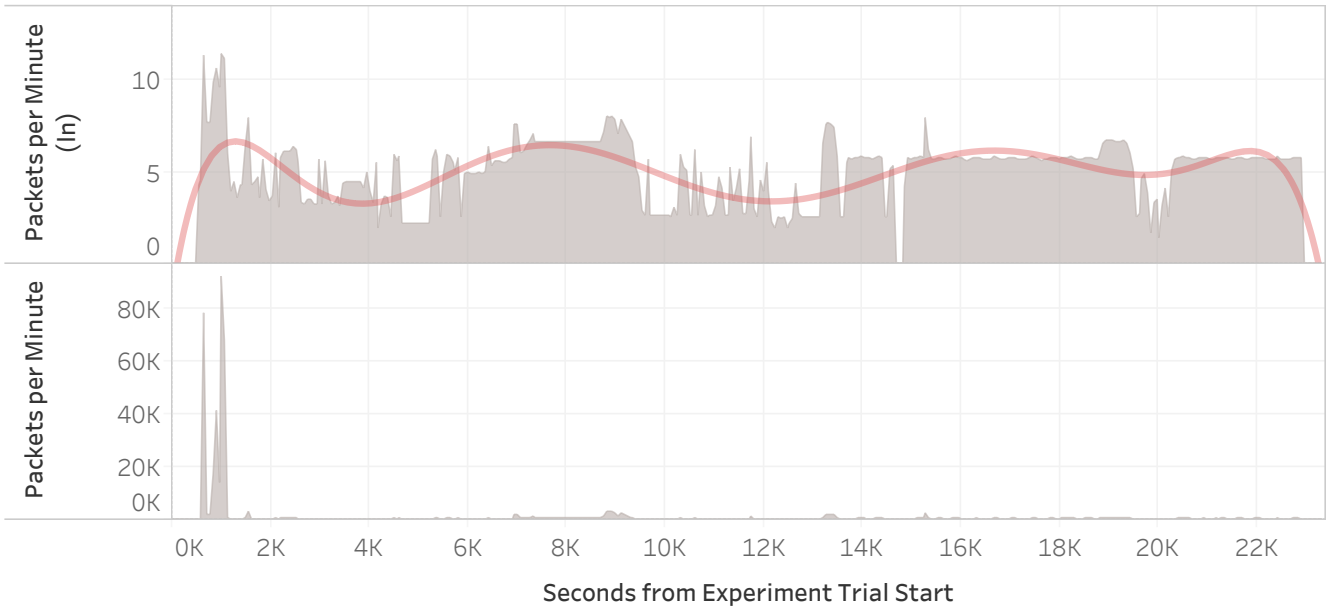


Running Sum of Packets

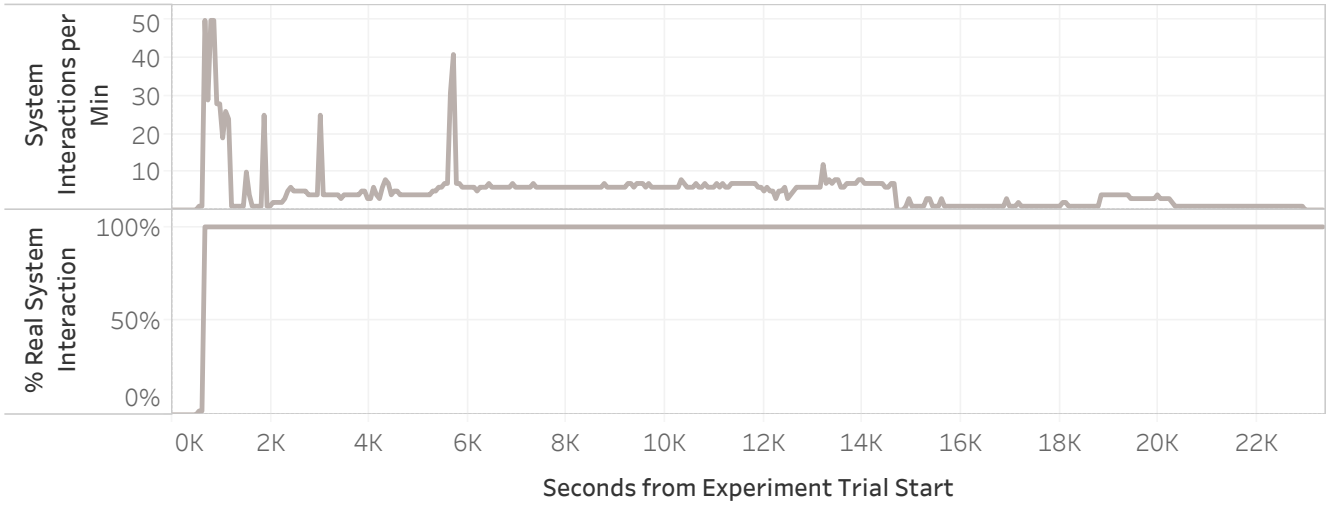


S46 - Day 2 - PUAU

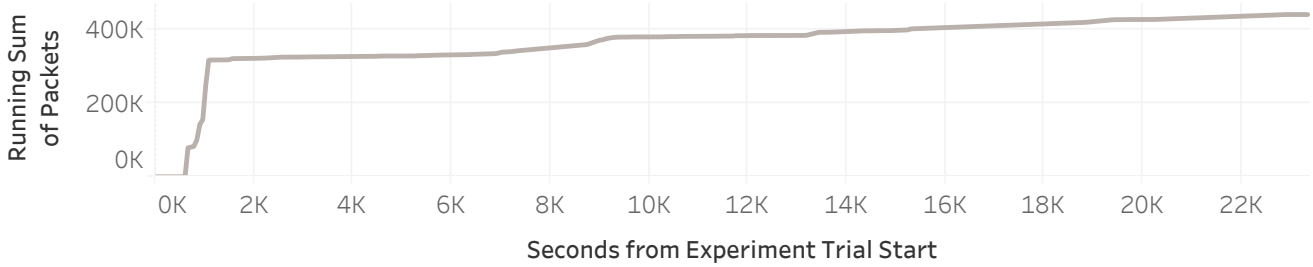
Real Packets per Minute



Real System Interaction Timeline

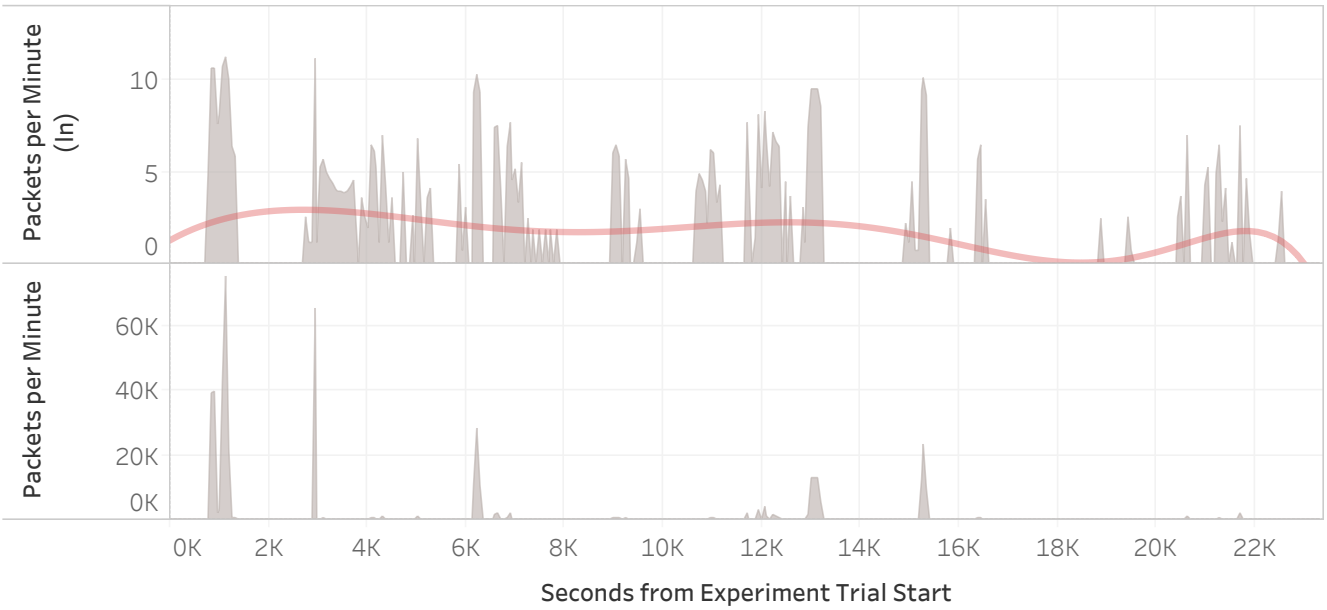


Running Sum of Packets

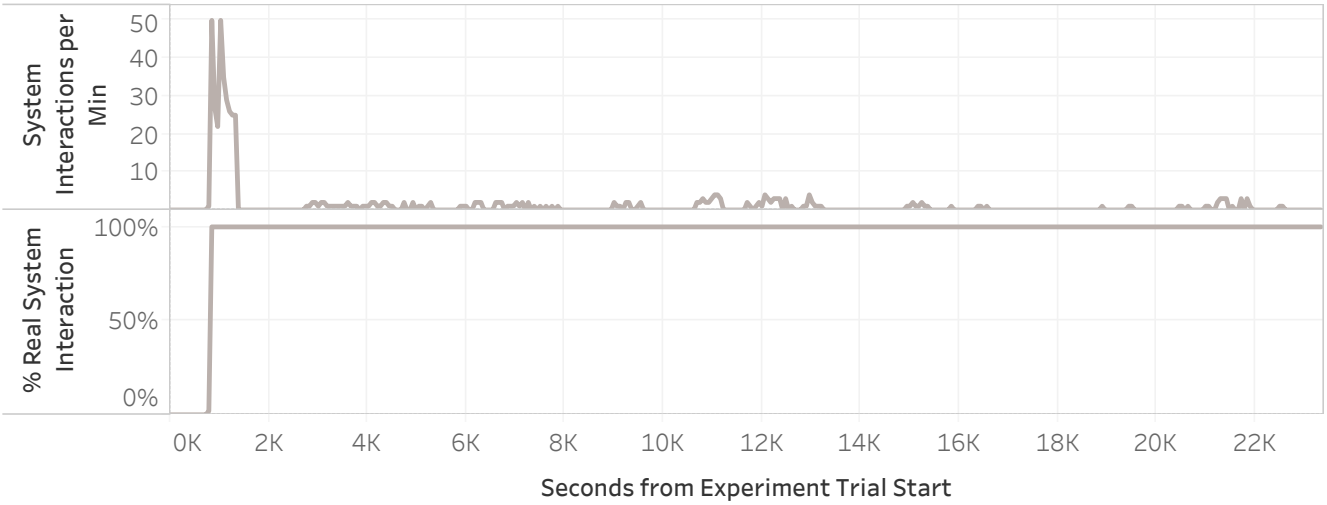


S47 - Day 2 - PUAU

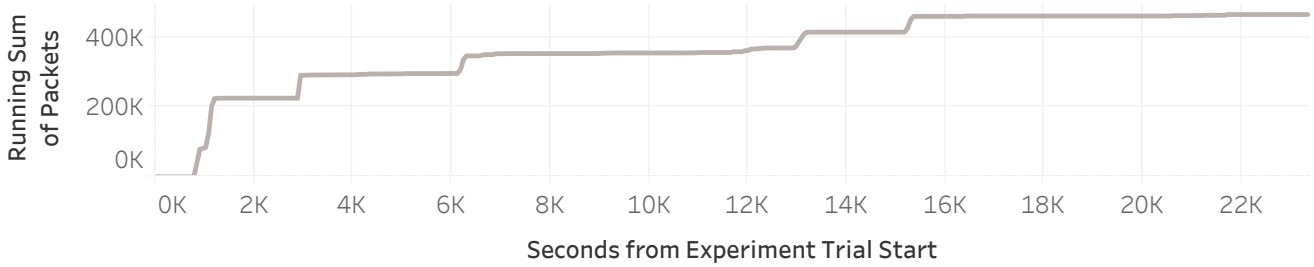
Real Packets per Minute



Real System Interaction Timeline

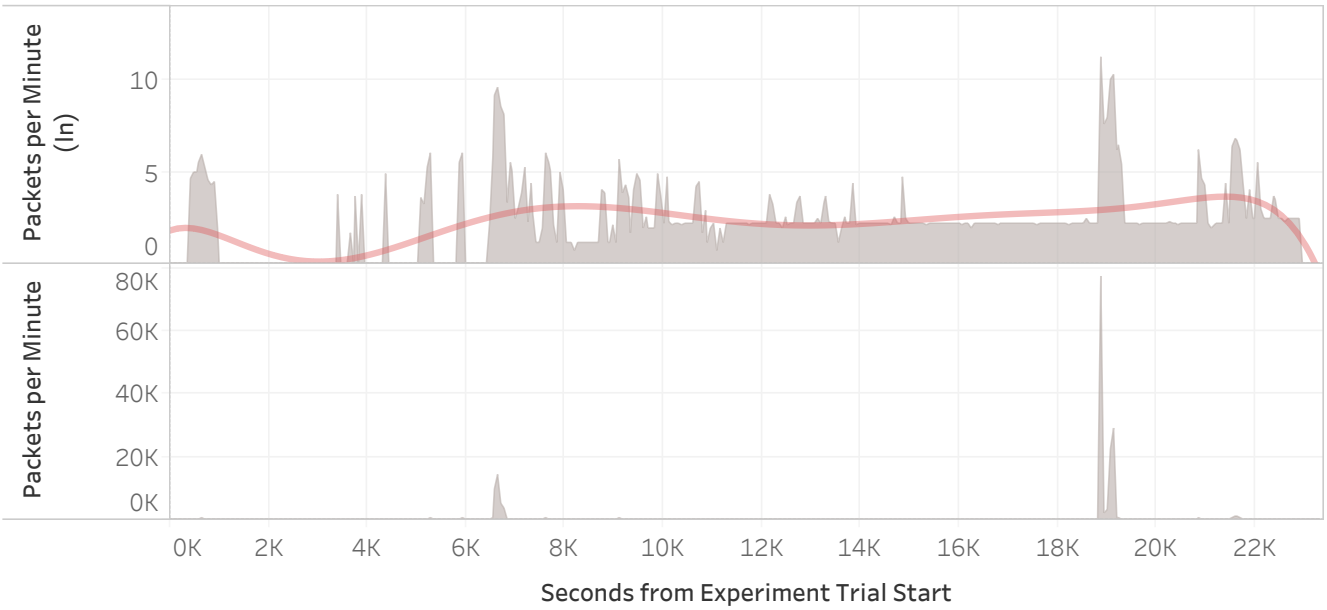


Running Sum of Packets

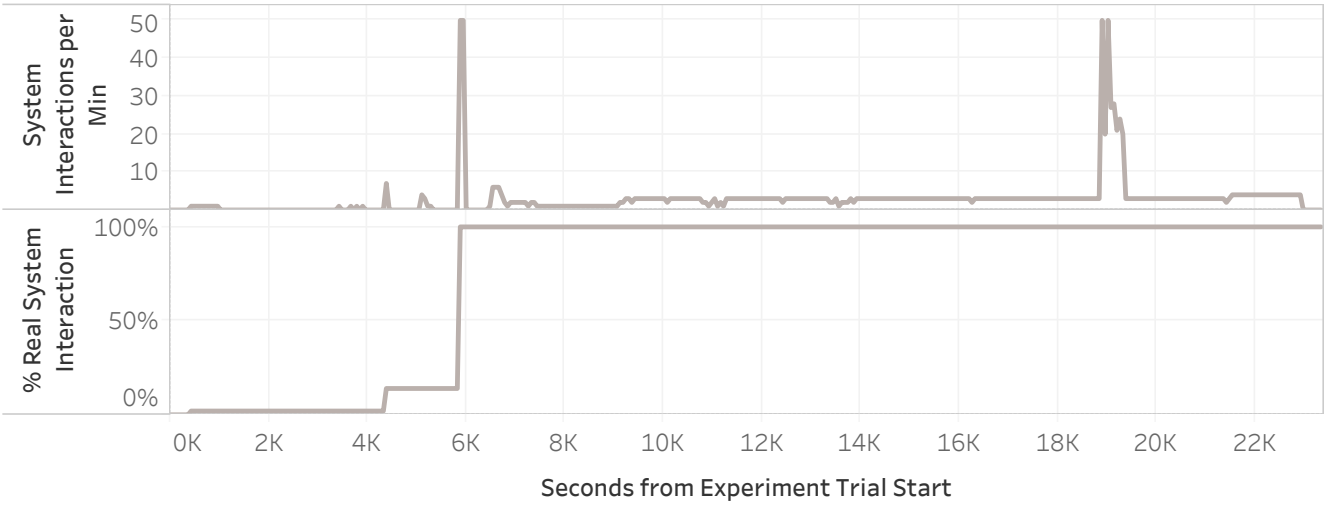


S48 - Day 2 - PUAU

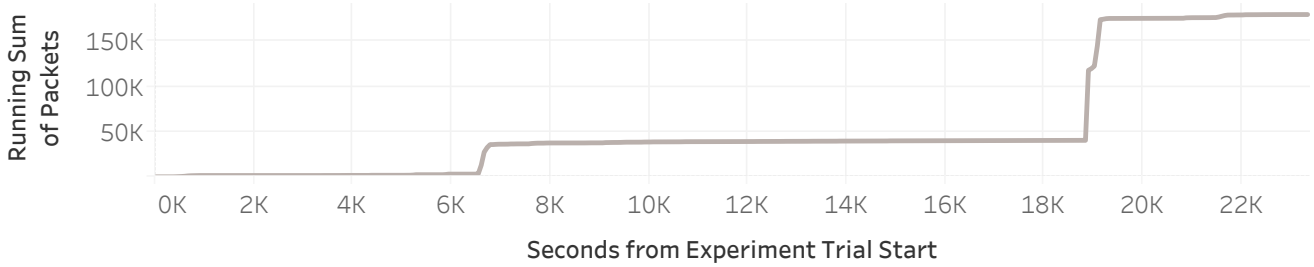
Real Packets per Minute



Real System Interaction Timeline

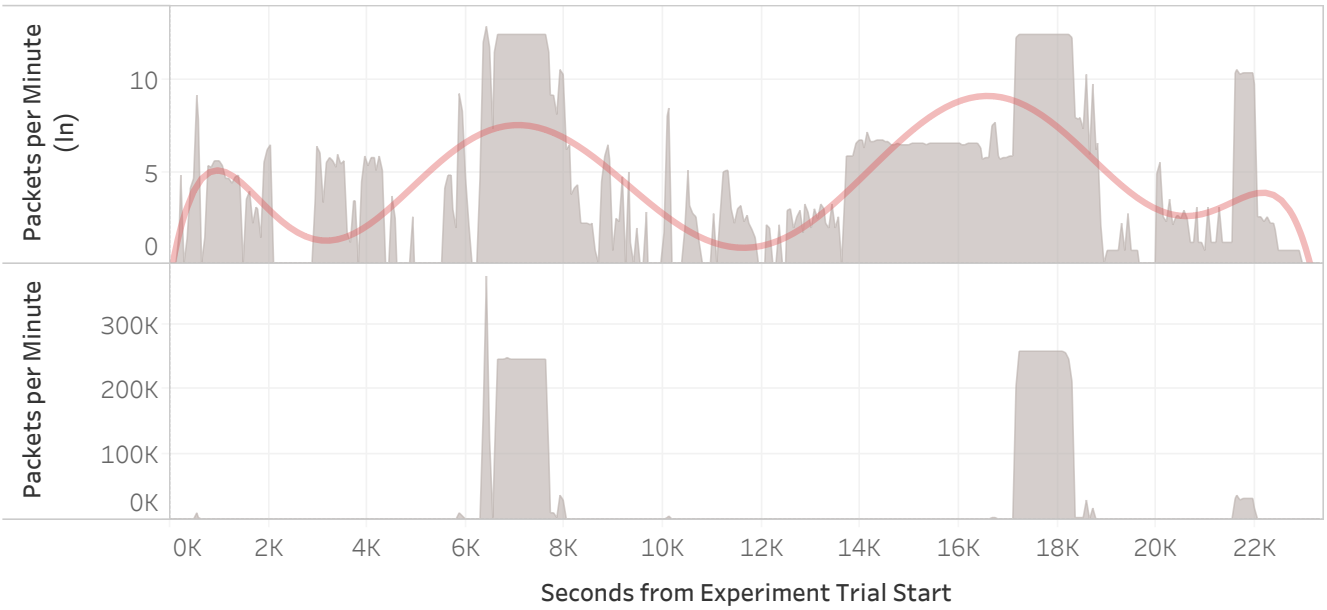


Running Sum of Packets

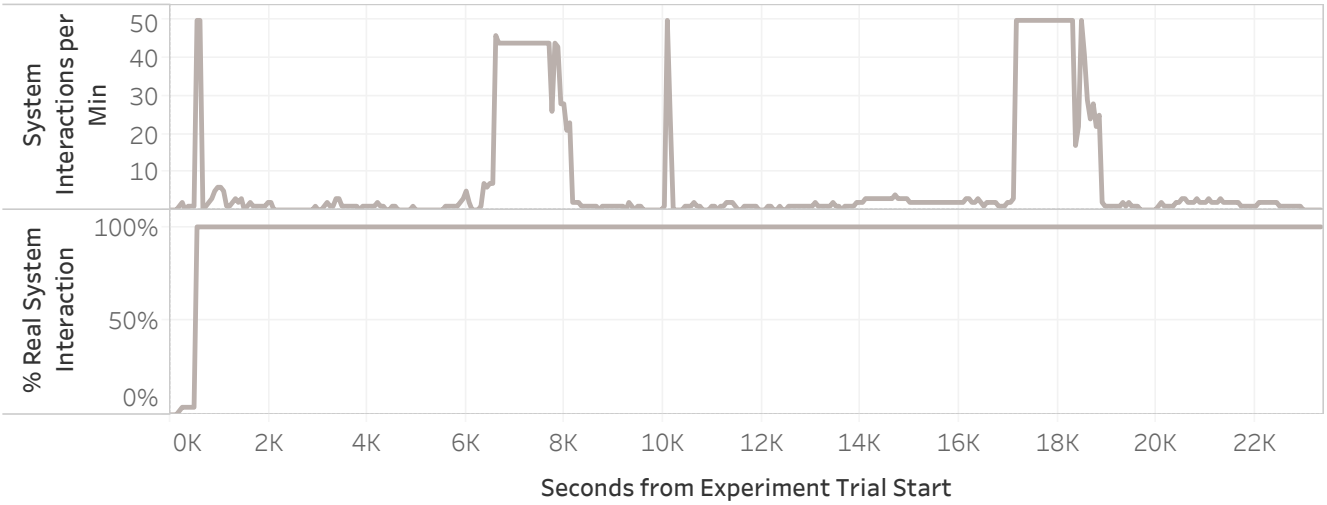


S50 - Day 2 - PUAU

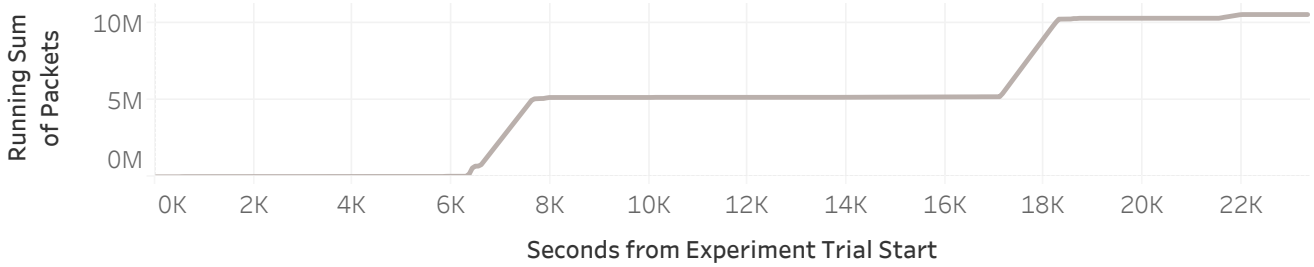
Real Packets per Minute



Real System Interaction Timeline

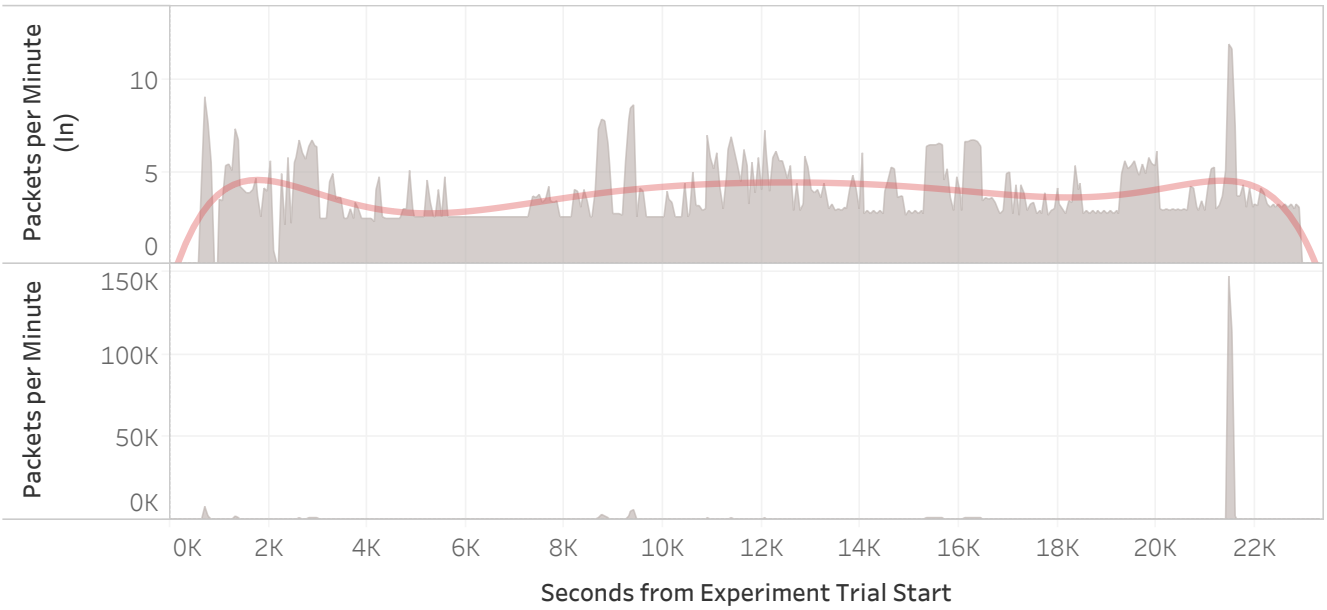


Running Sum of Packets

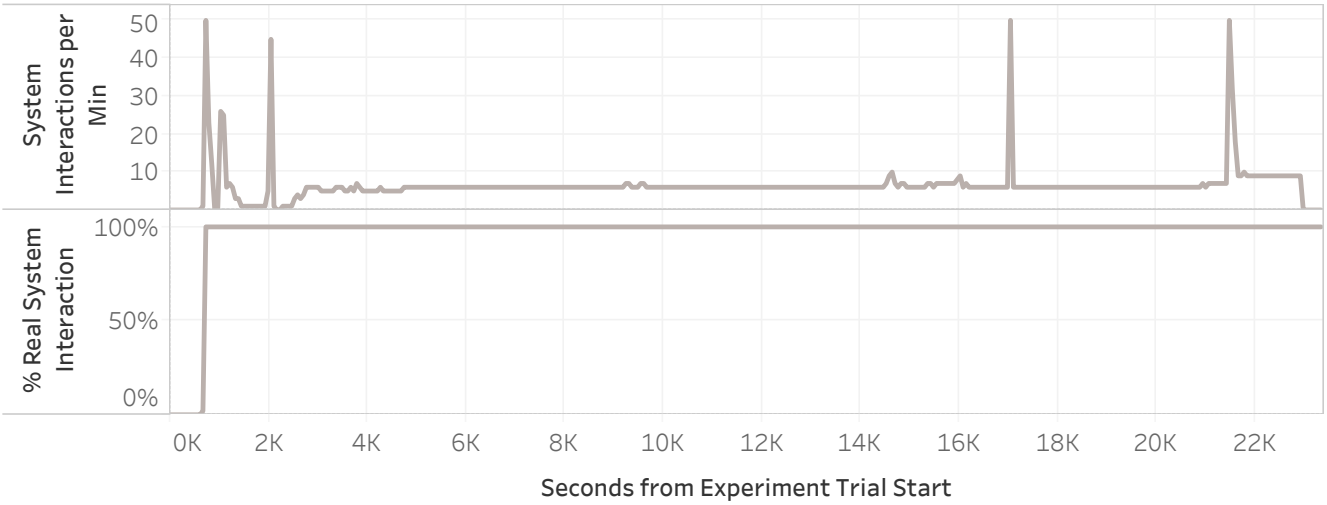


S51 - Day 2 - PUAU

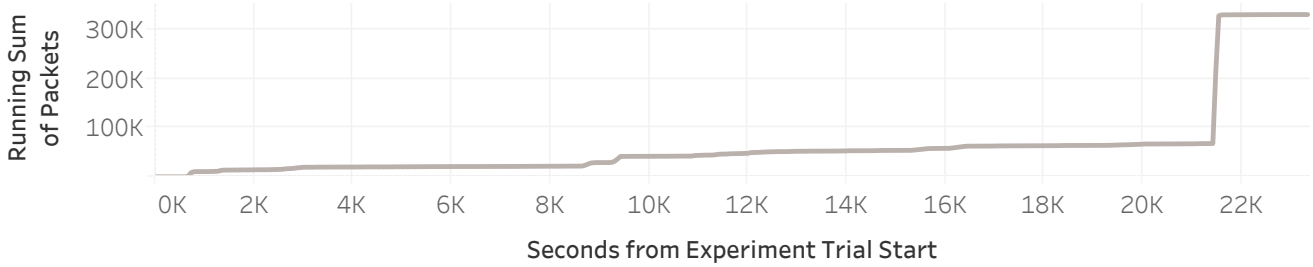
Real Packets per Minute



Real System Interaction Timeline

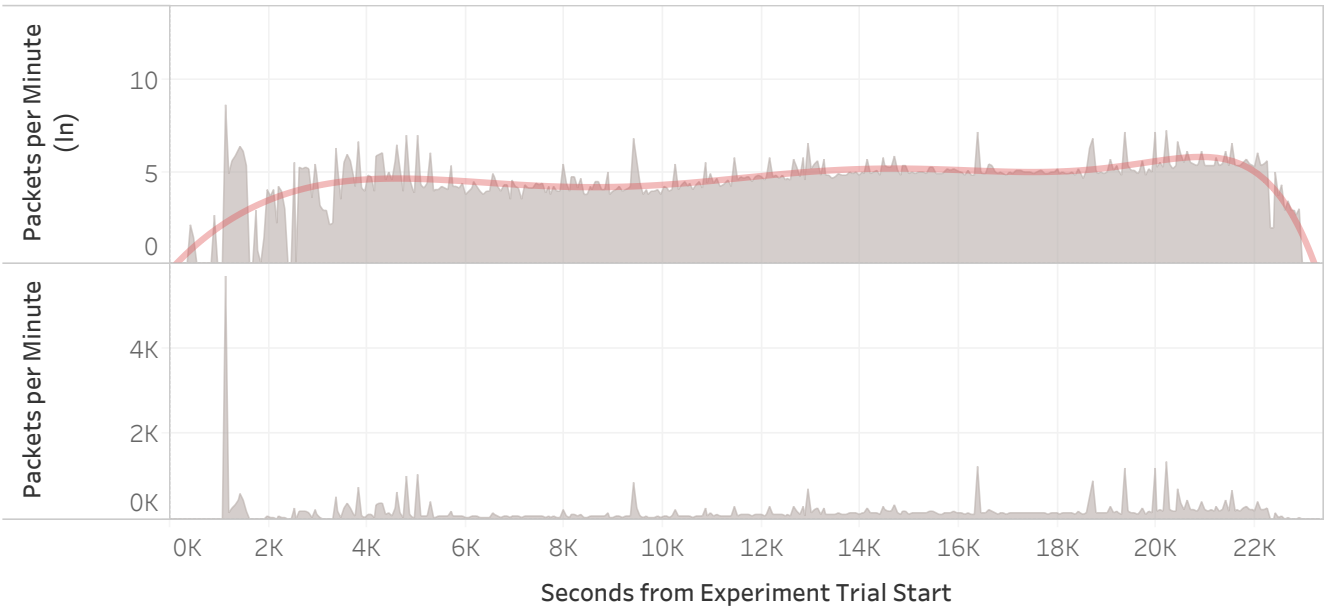


Running Sum of Packets

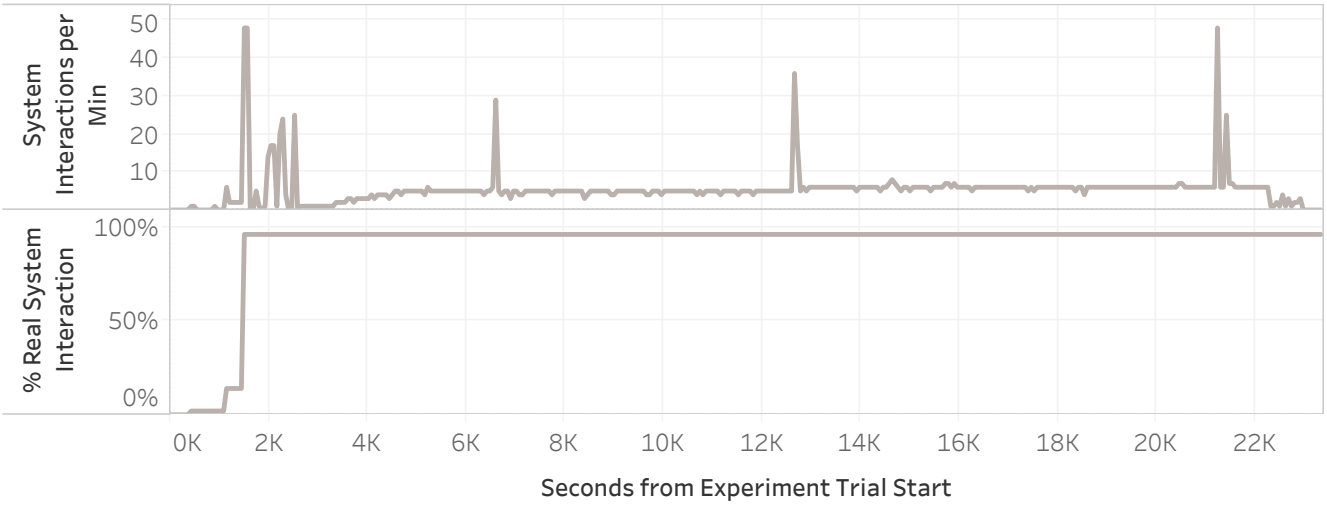


S52 - Day 2 - PUAU

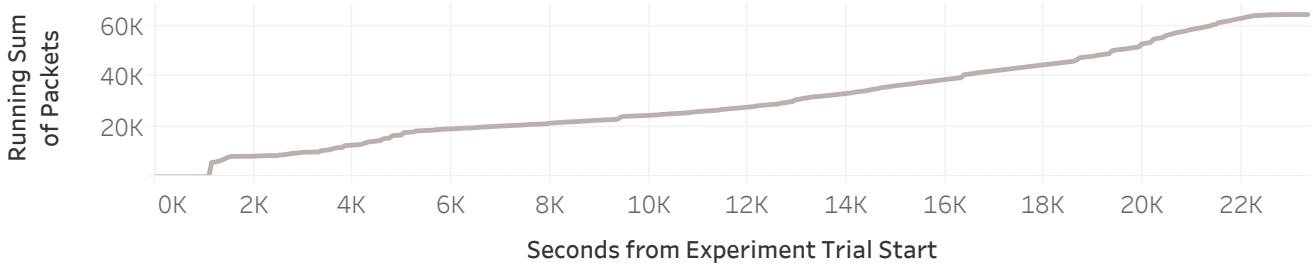
Real Packets per Minute



Real System Interaction Timeline

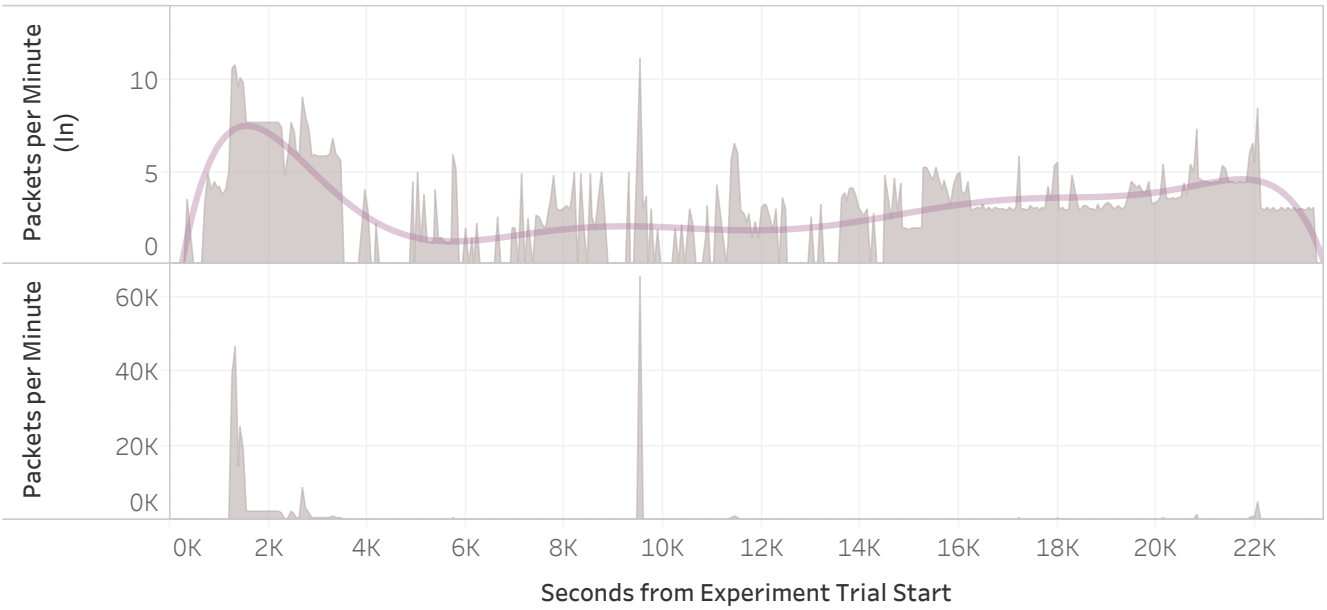


Running Sum of Packets

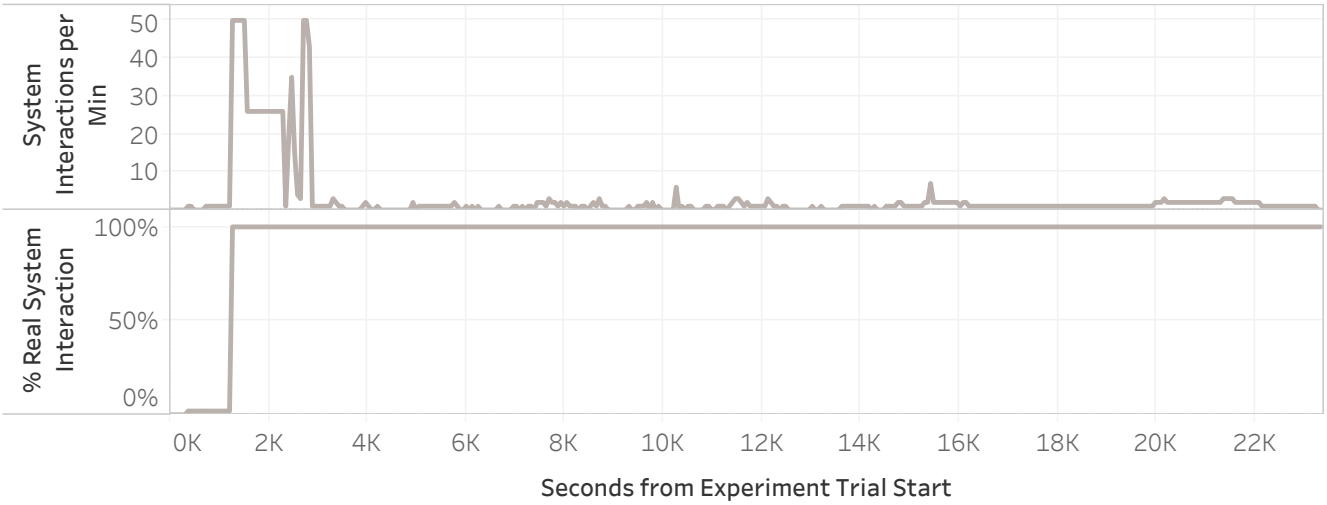


S53 - Day 2 - PIAU

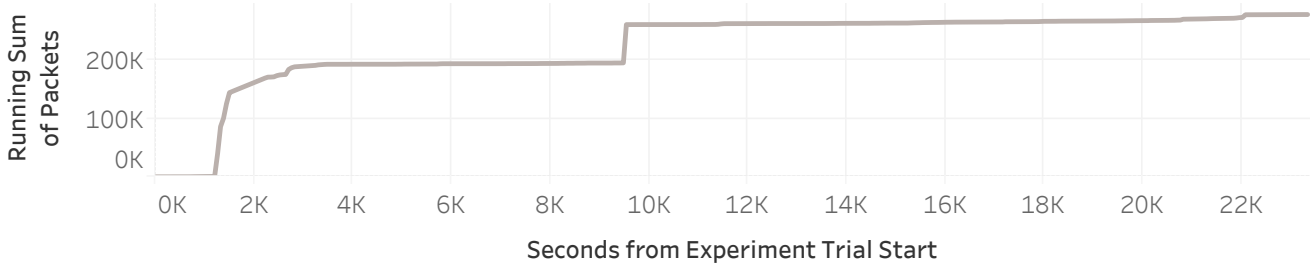
Real Packets per Minute



Real System Interaction Timeline

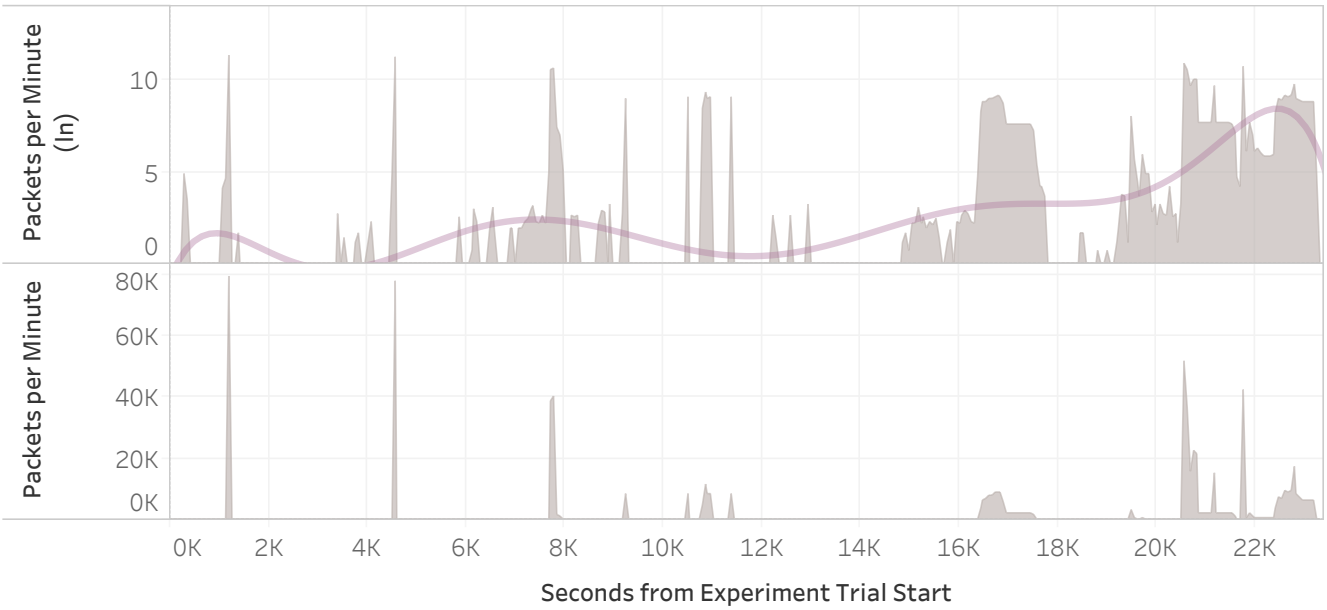


Running Sum of Packets

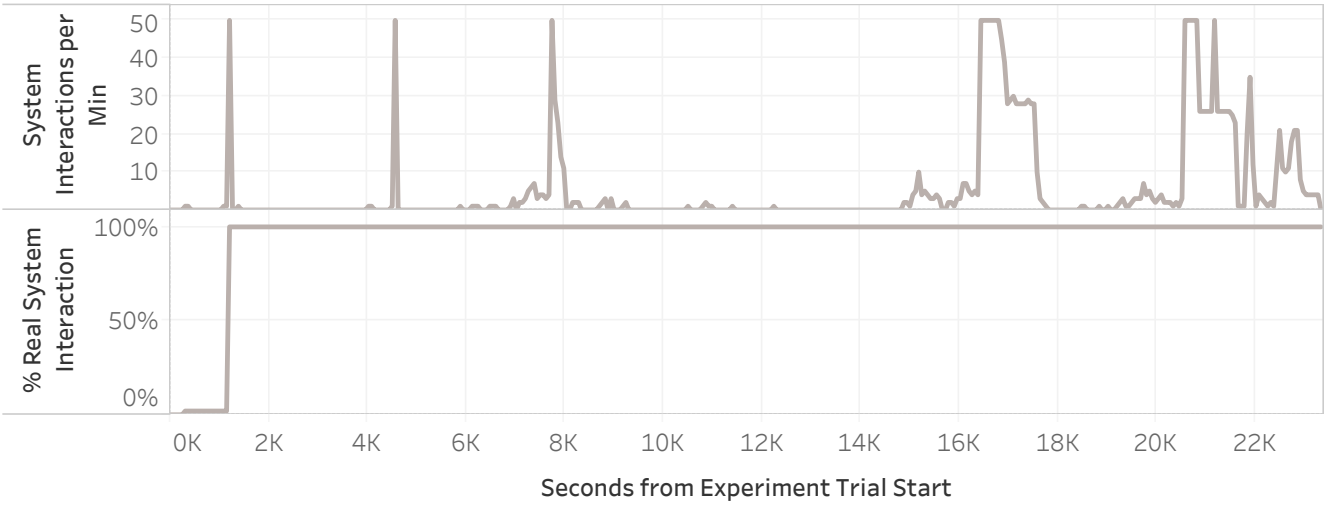


S54 - Day 2 - PIAU

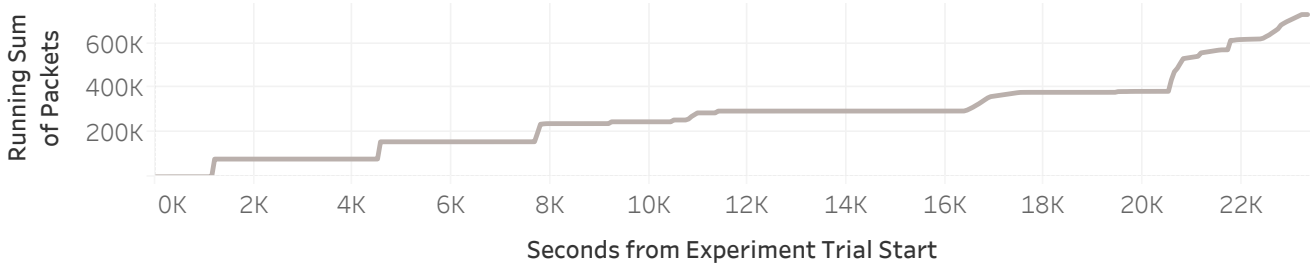
Real Packets per Minute



Real System Interaction Timeline

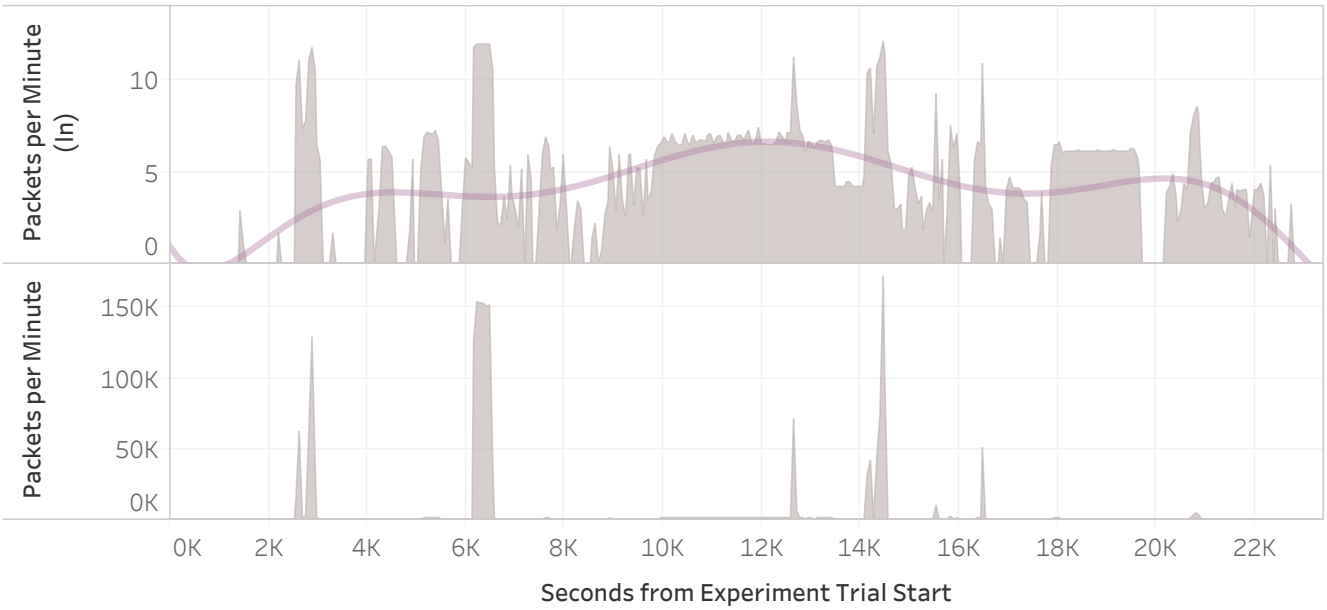


Running Sum of Packets

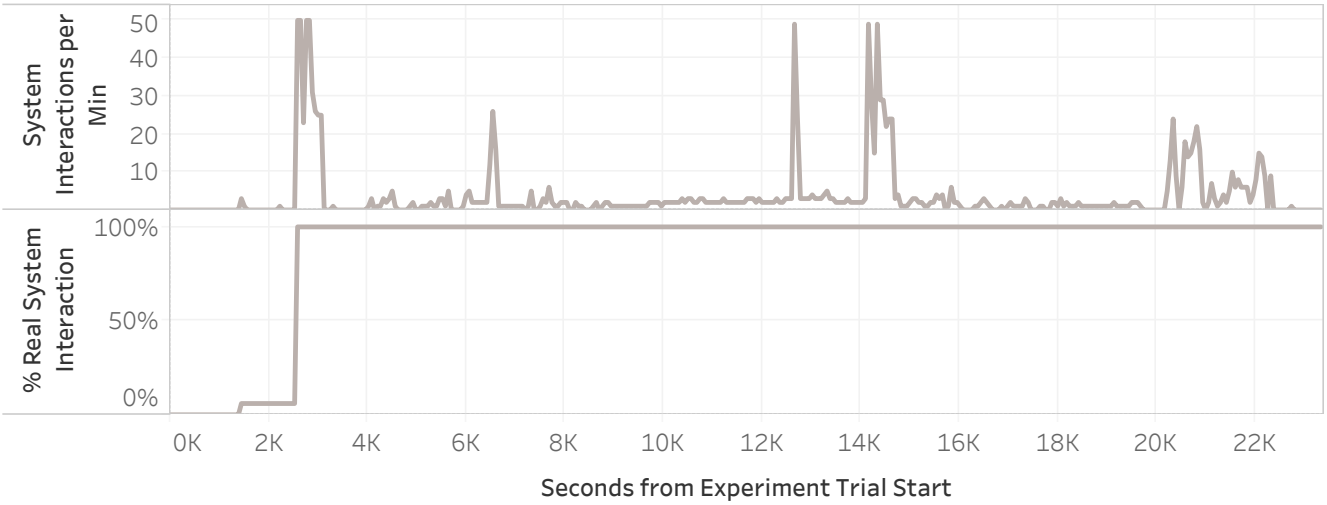


S56 - Day 2 - PIAU

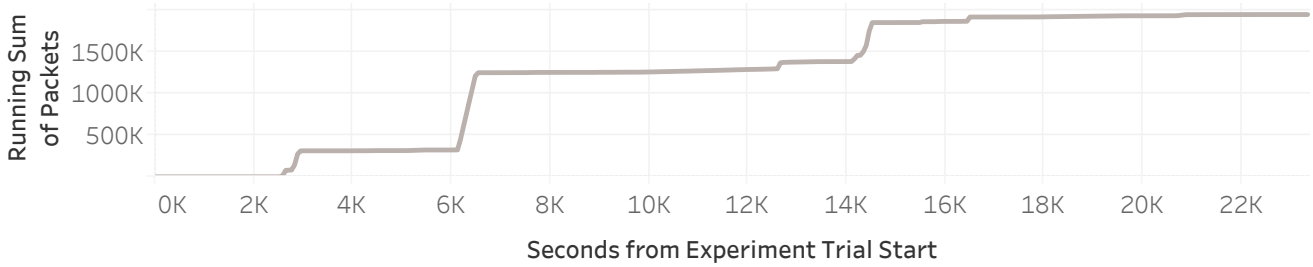
Real Packets per Minute



Real System Interaction Timeline

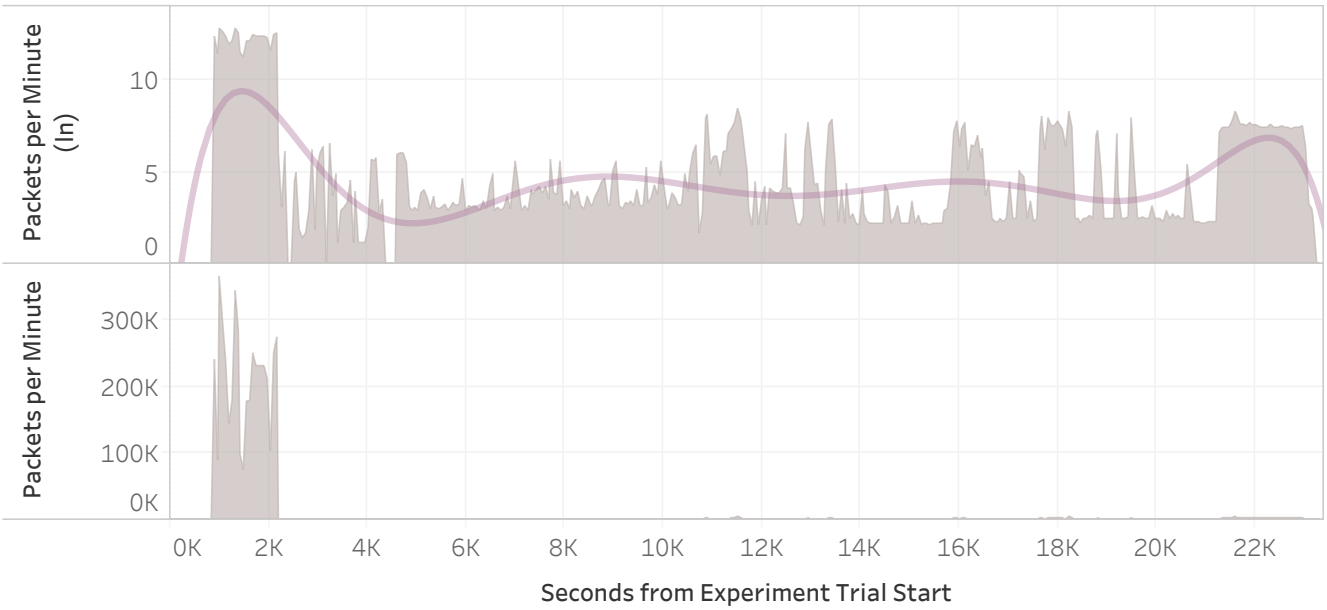


Running Sum of Packets

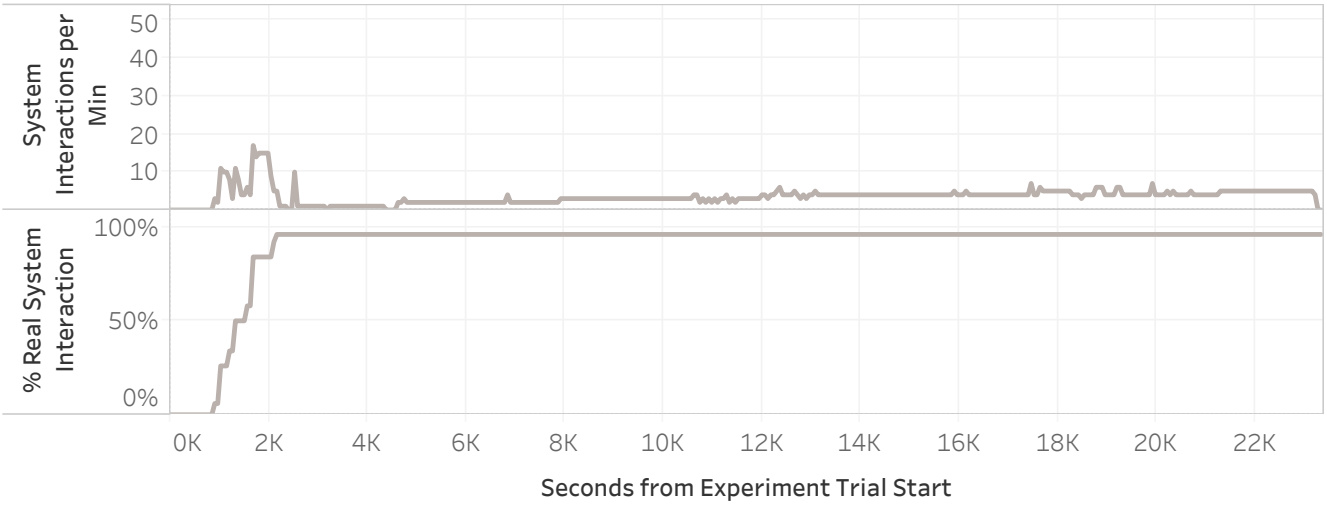


S57 - Day 2 - PIAU

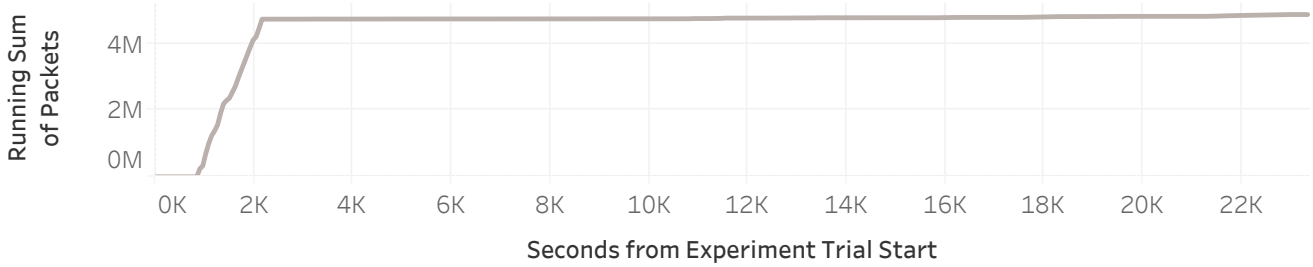
Real Packets per Minute



Real System Interaction Timeline

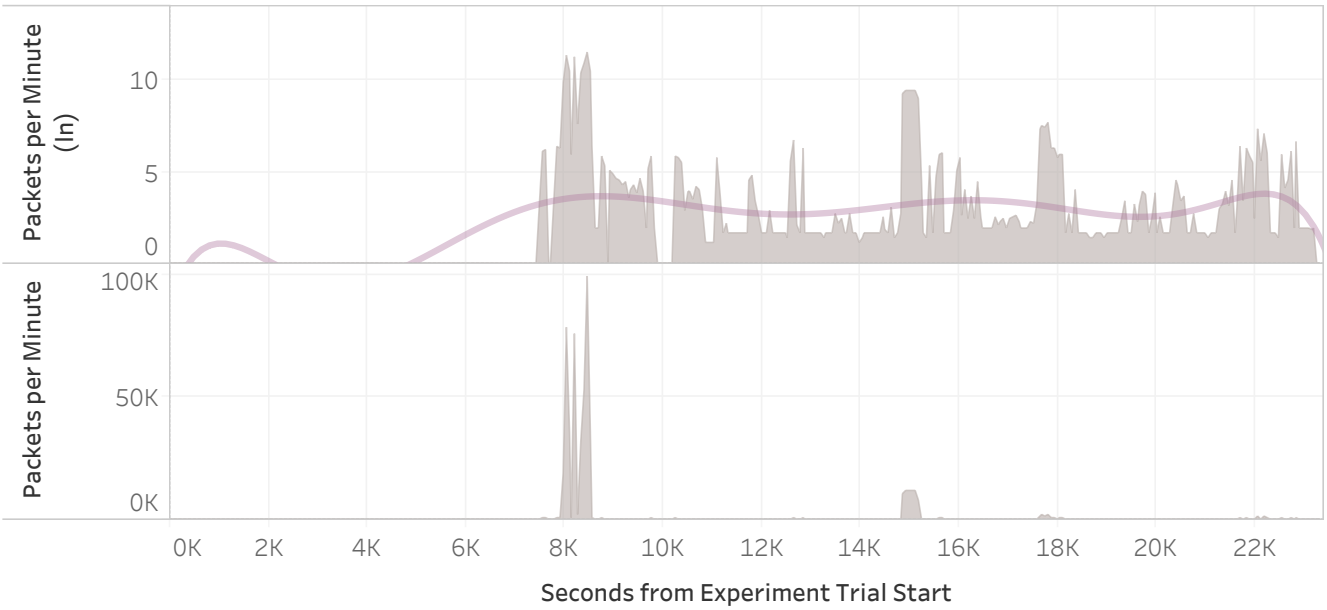


Running Sum of Packets

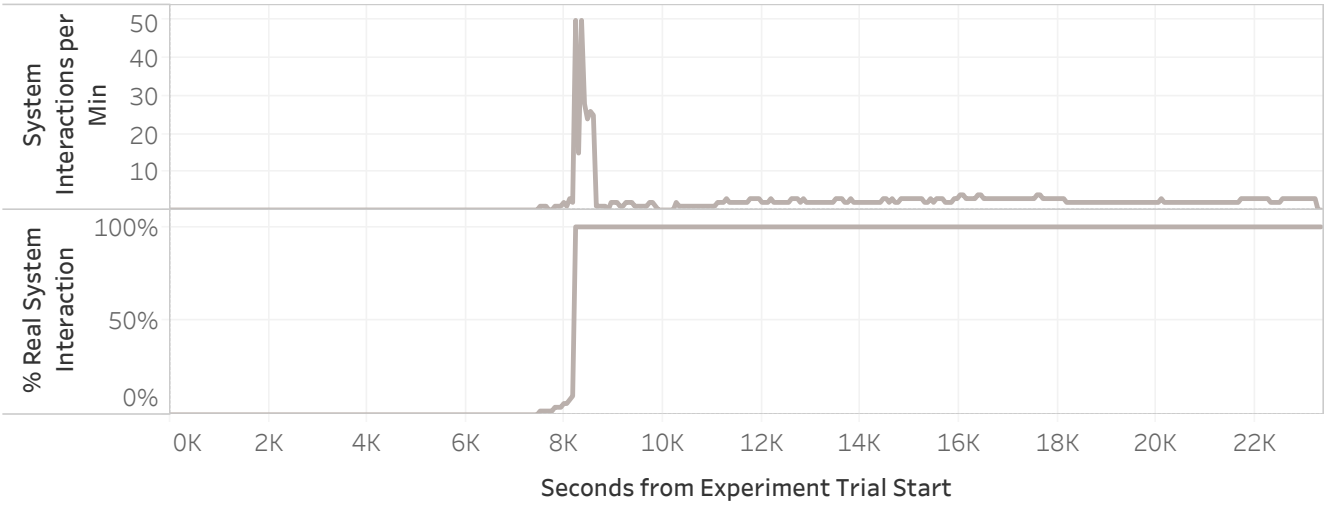


S58 - Day 2 - PIAU

Real Packets per Minute



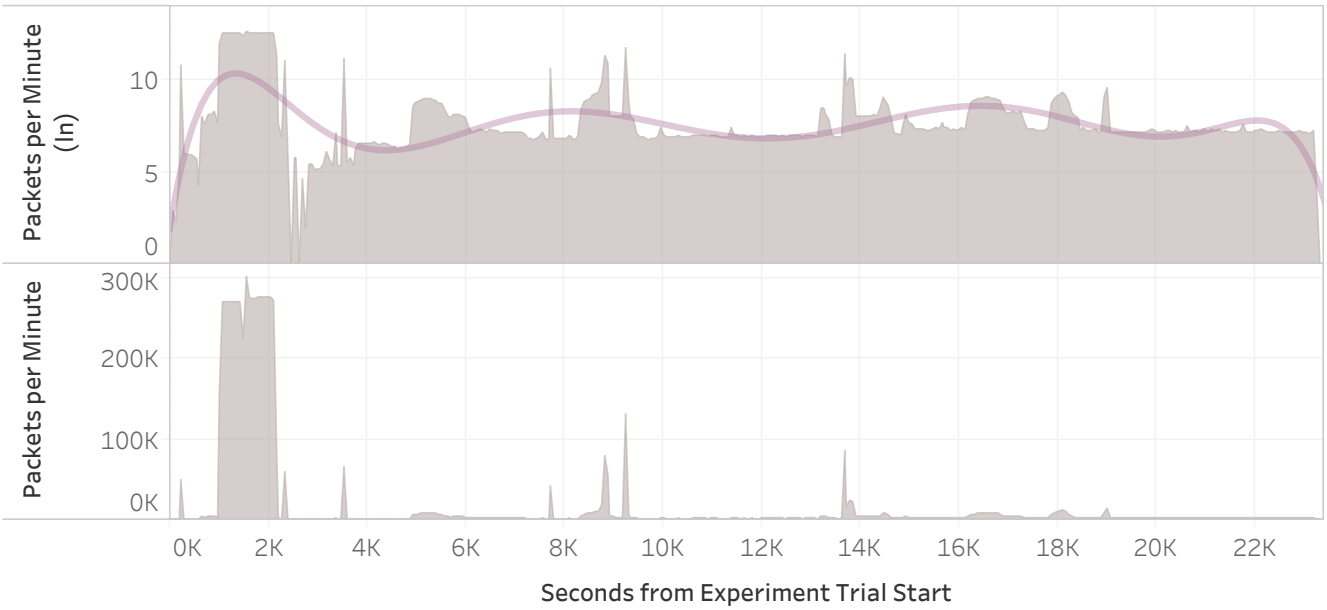
Real System Interaction Timeline



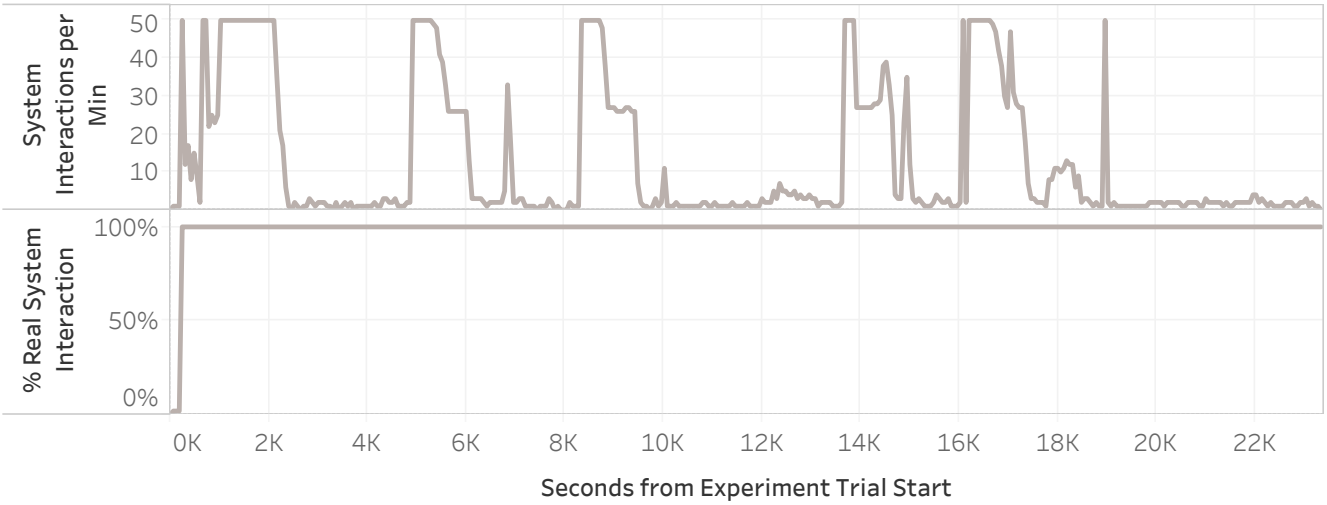
Running Sum of Packets

S59 - Day 2 - PIAU

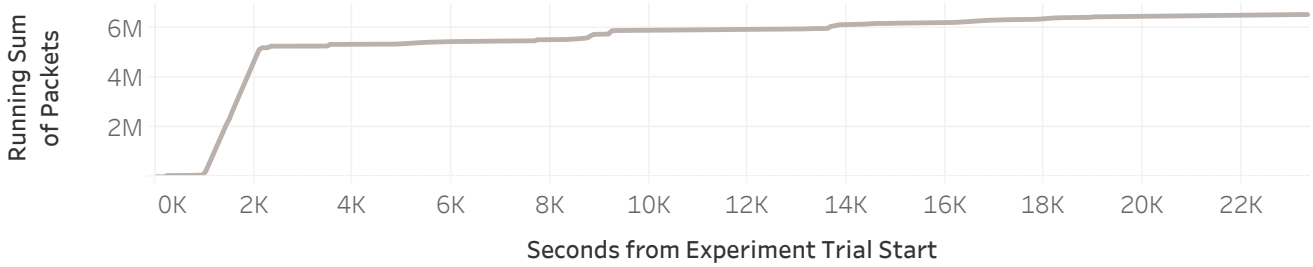
Real Packets per Minute



Real System Interaction Timeline

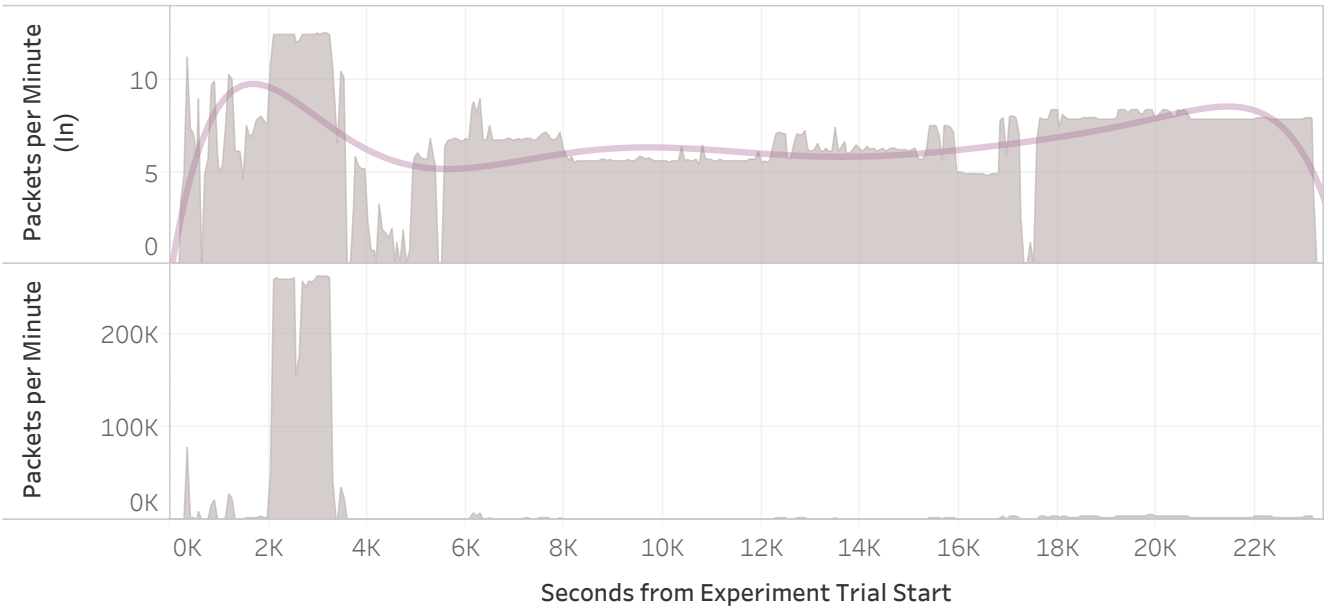


Running Sum of Packets

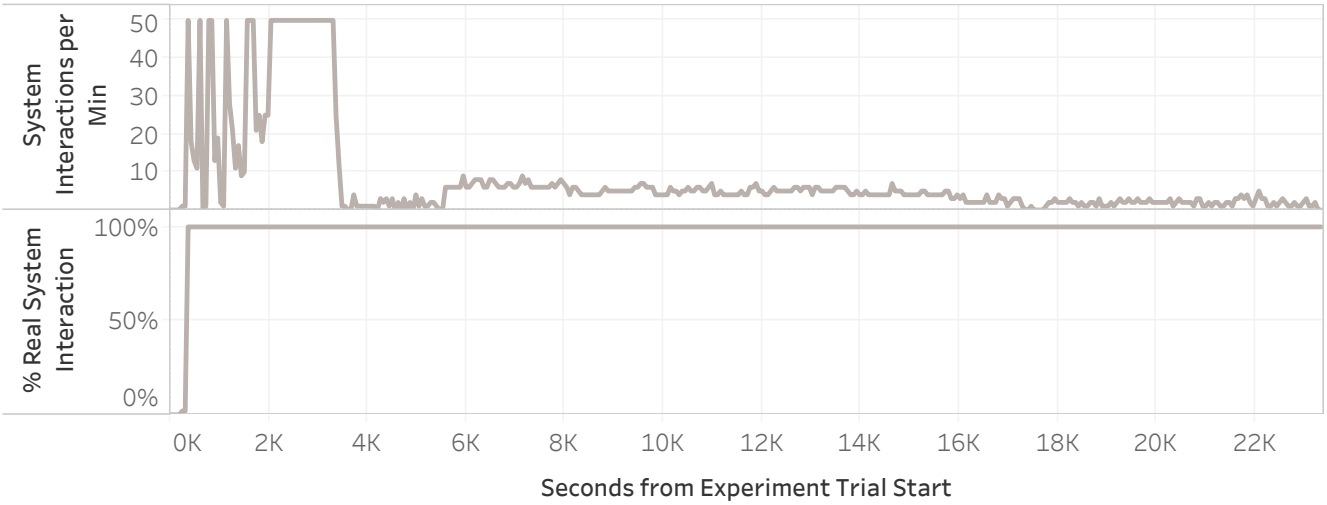


S60 - Day 2 - PIAU

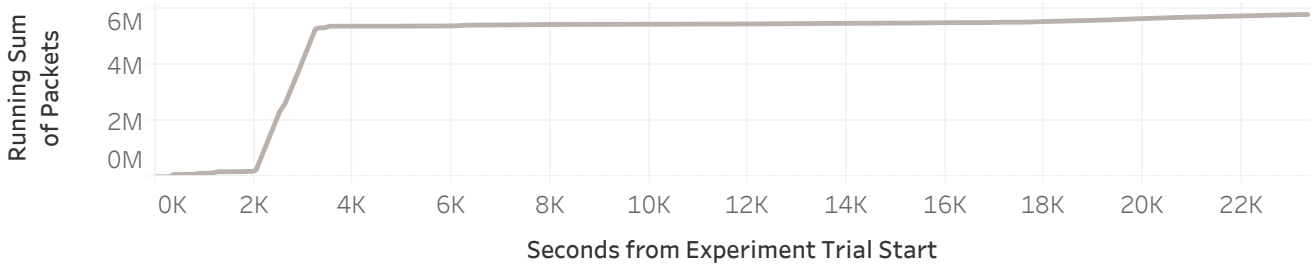
Real Packets per Minute



Real System Interaction Timeline

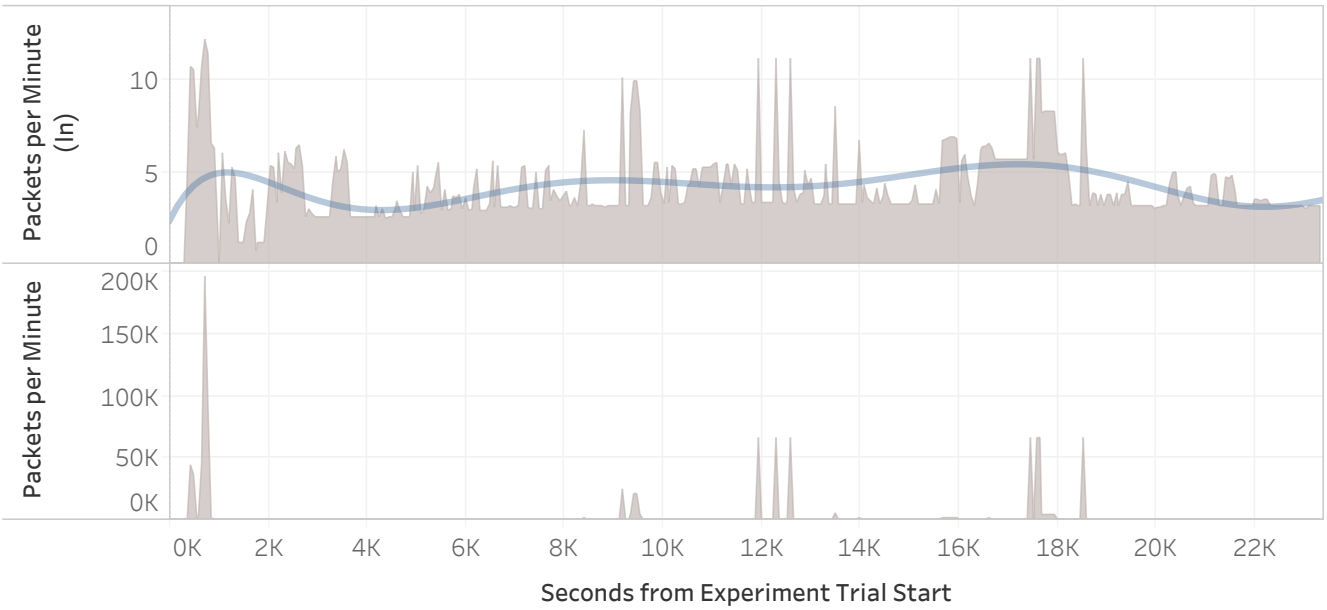


Running Sum of Packets

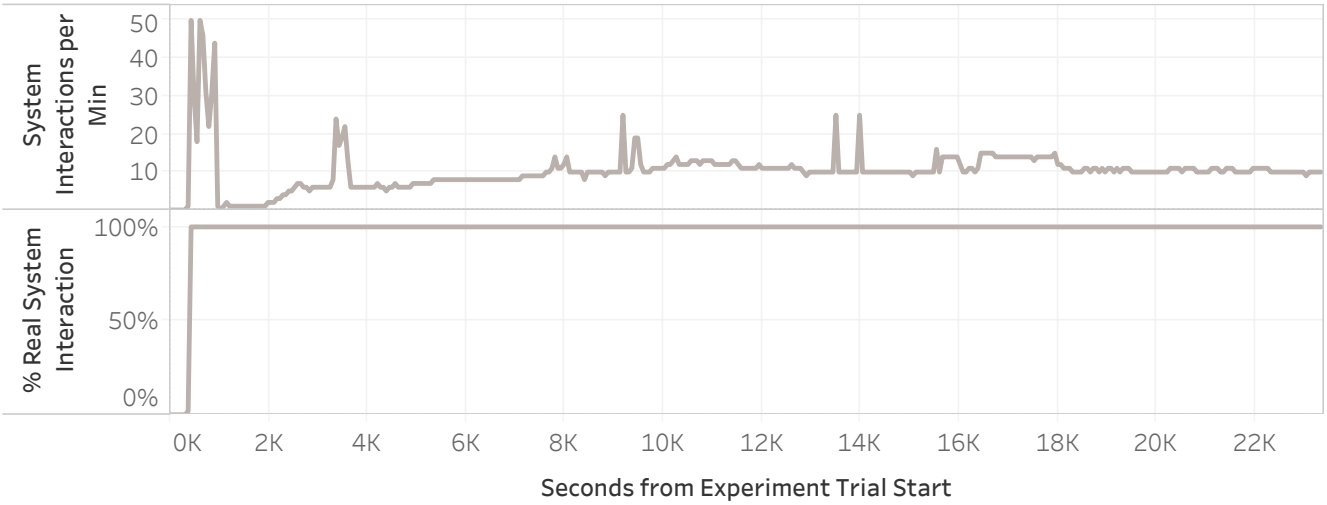


S61 - Day 2 - AIAU

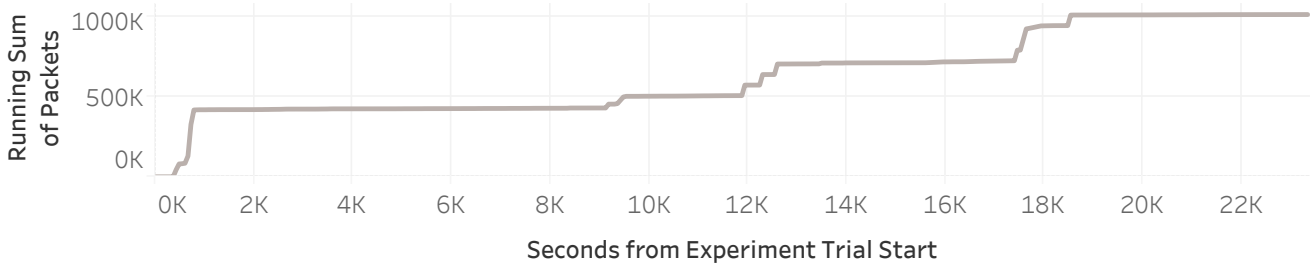
Real Packets per Minute



Real System Interaction Timeline

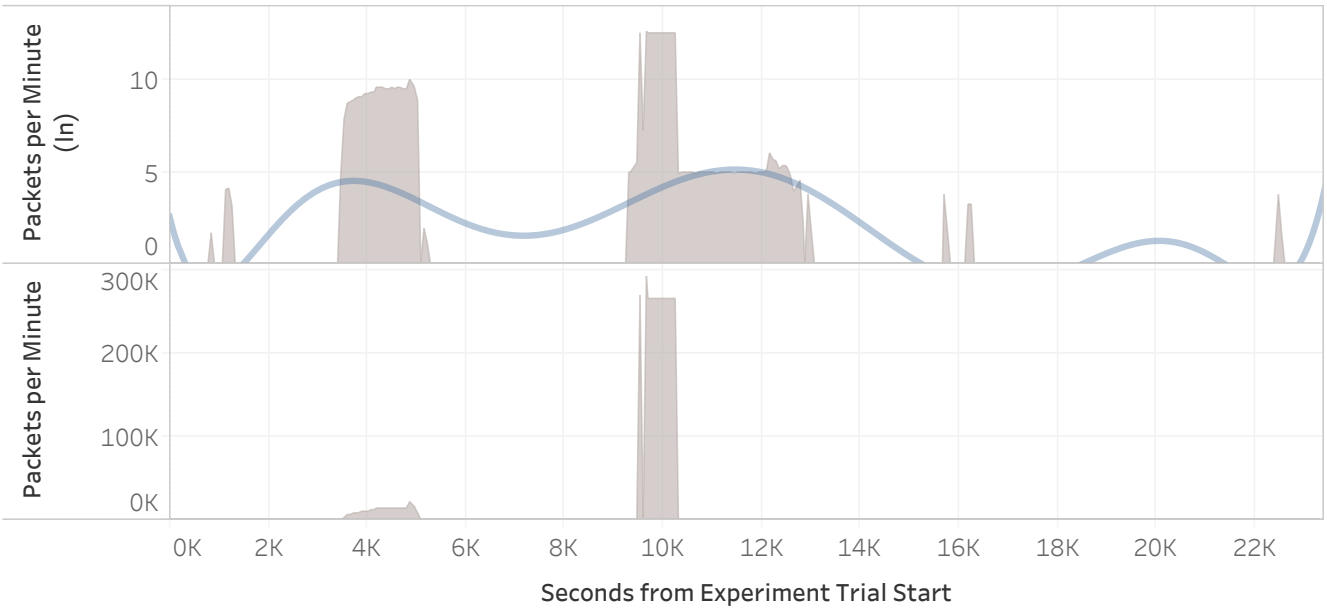


Running Sum of Packets

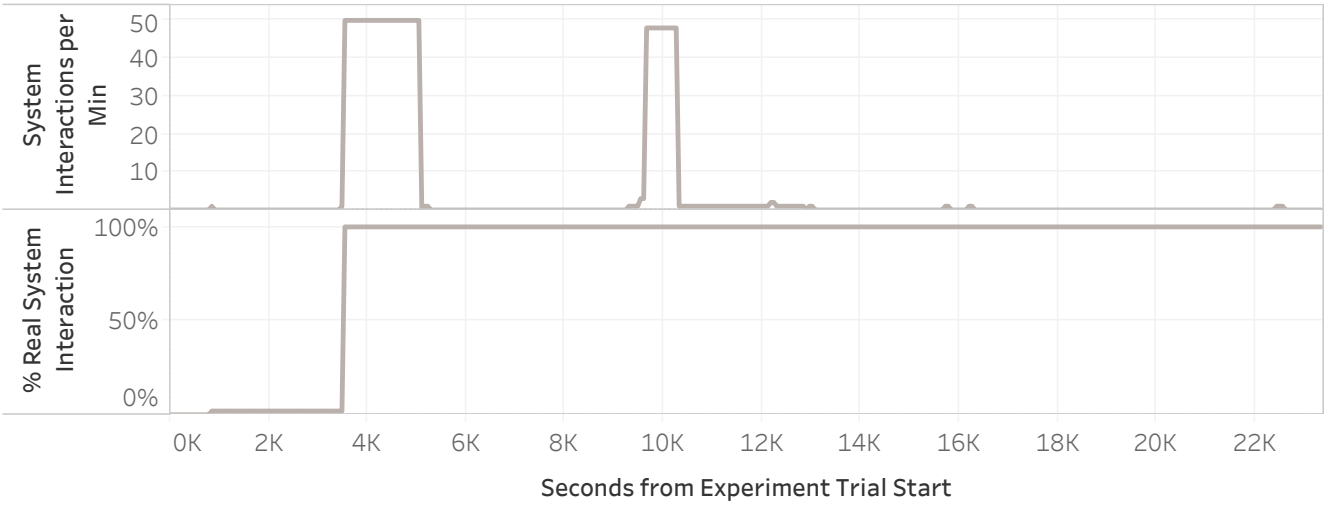


S62 - Day 2 - AIAU

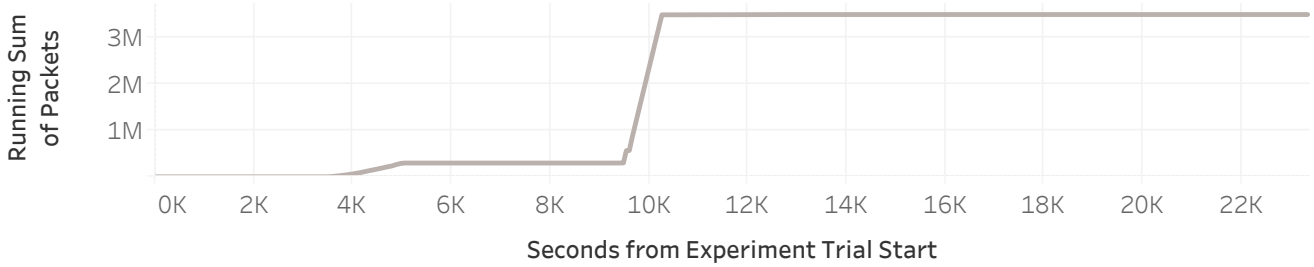
Real Packets per Minute



Real System Interaction Timeline

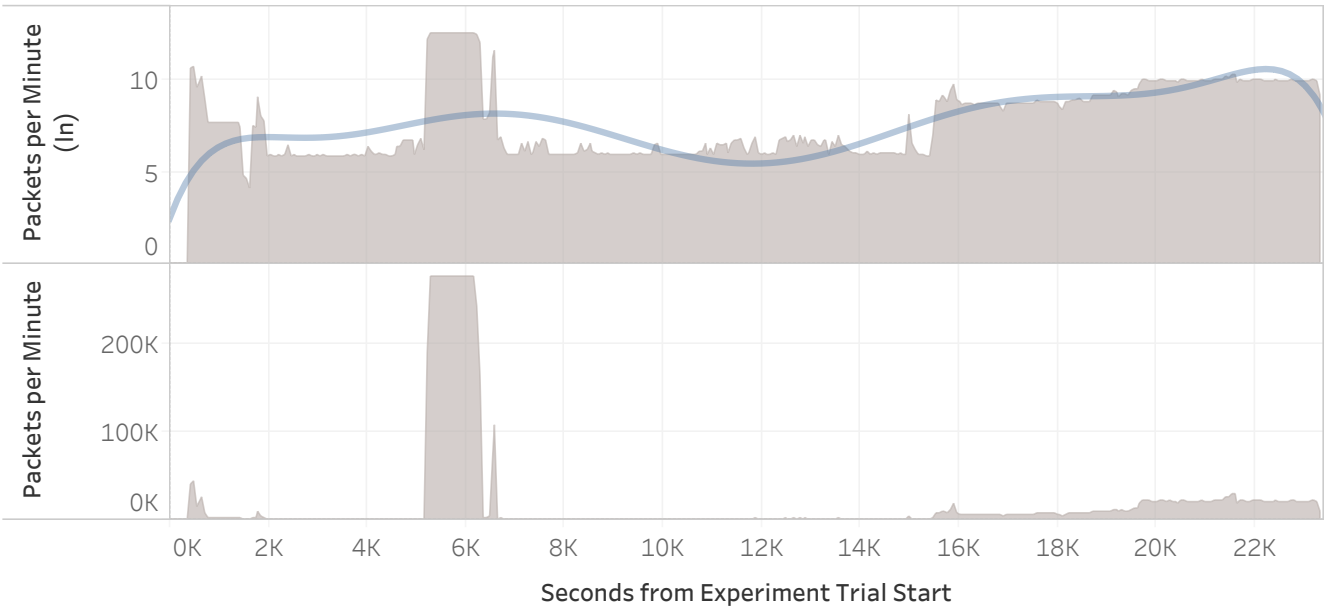


Running Sum of Packets

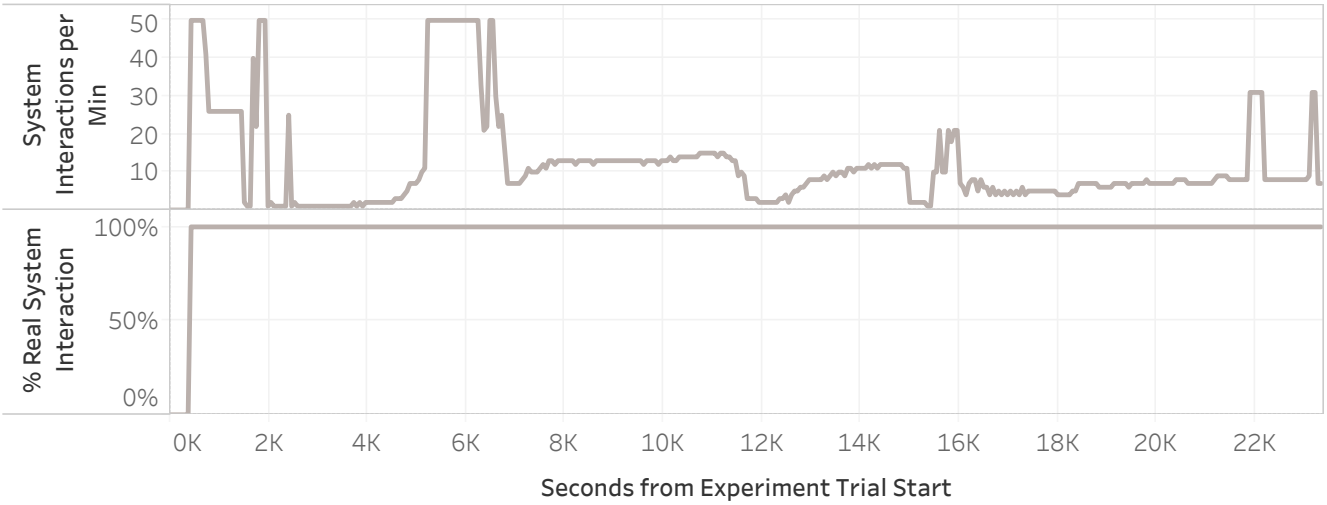


S63 - Day 2 - AIAU

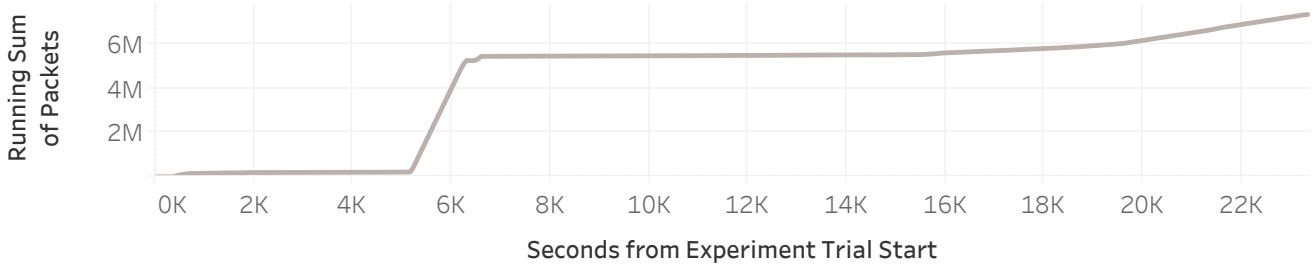
Real Packets per Minute



Real System Interaction Timeline

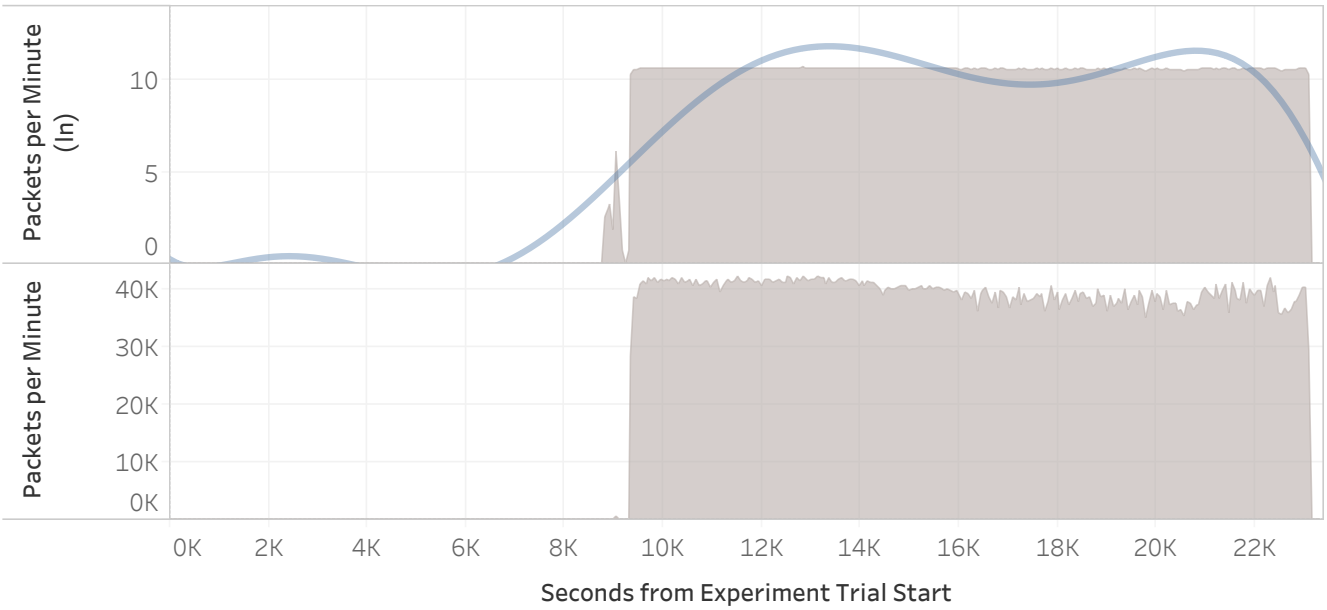


Running Sum of Packets

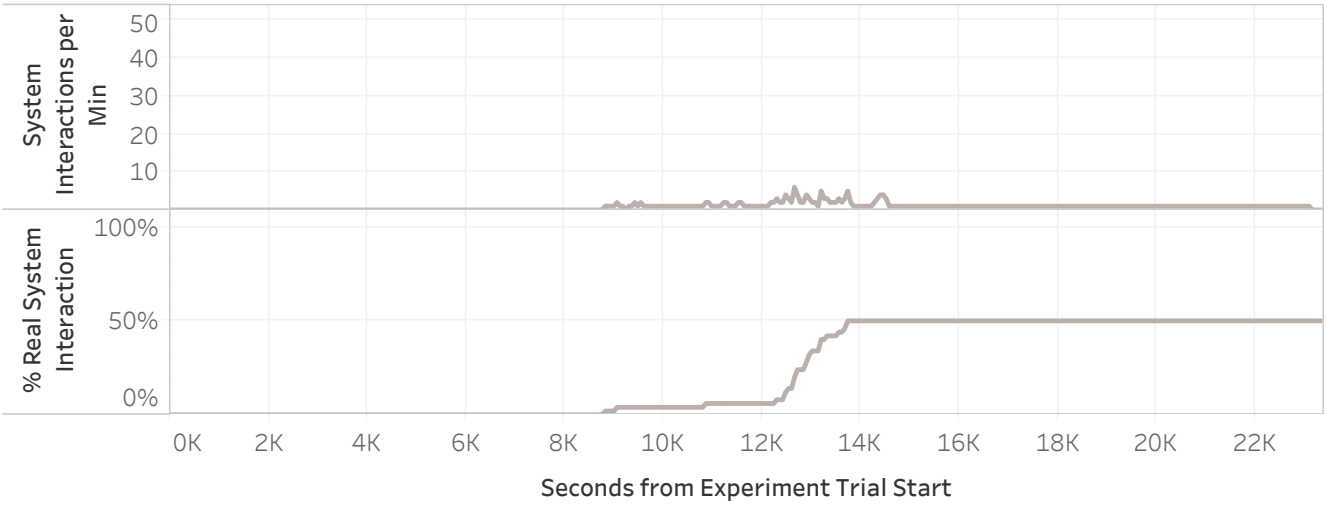


S64 - Day 2 - AIAU

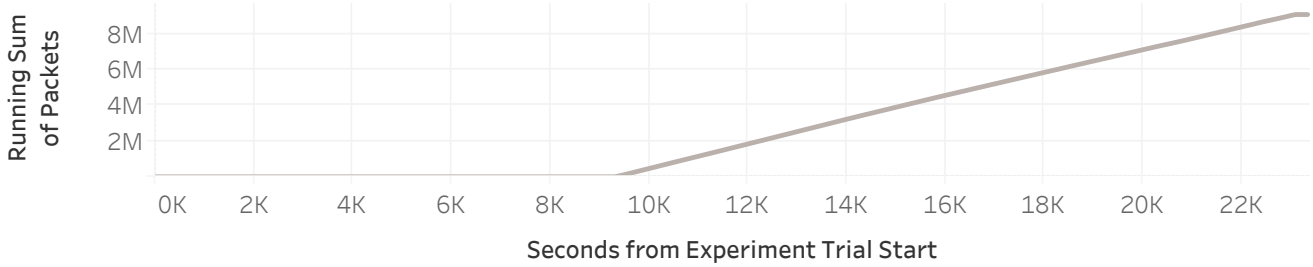
Real Packets per Minute



Real System Interaction Timeline

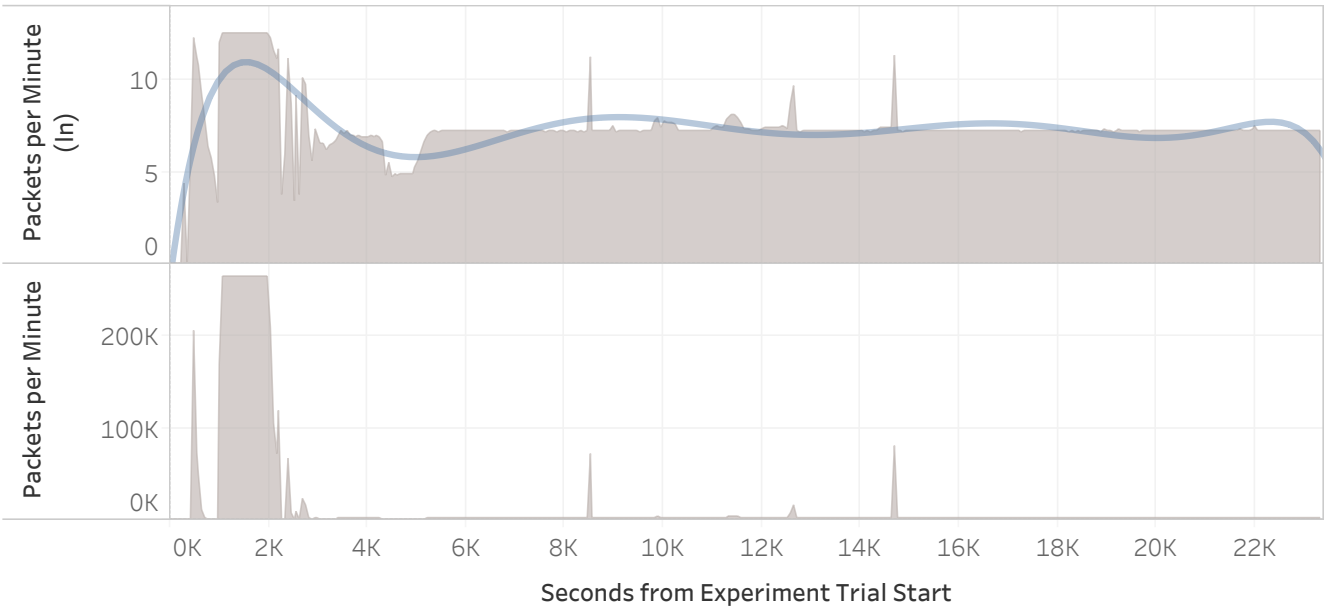


Running Sum of Packets

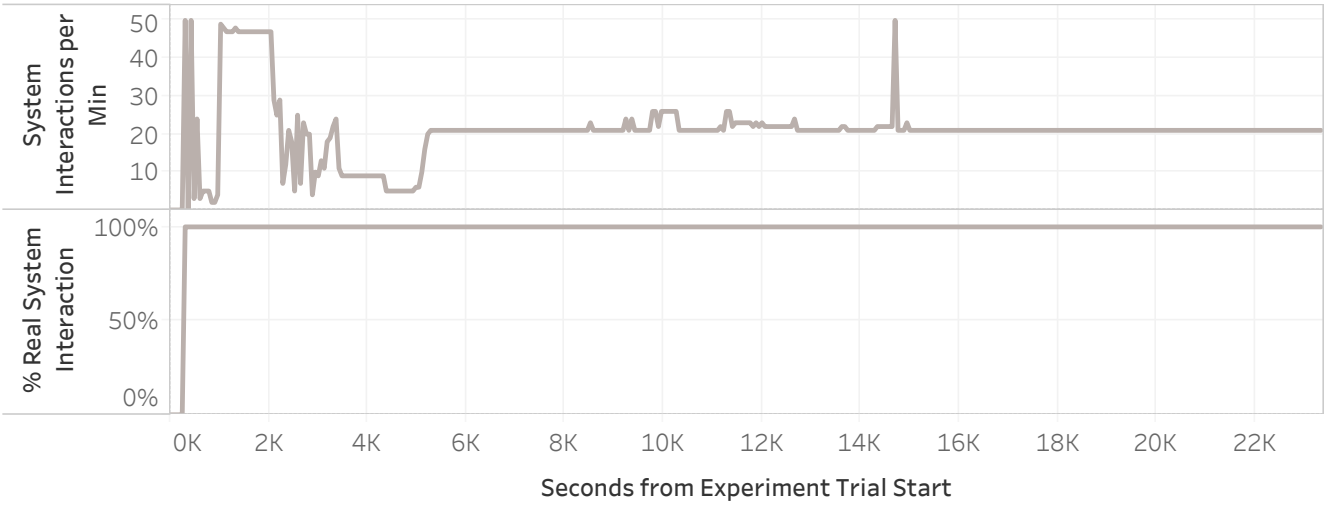


S65 - Day 2 - AIAU

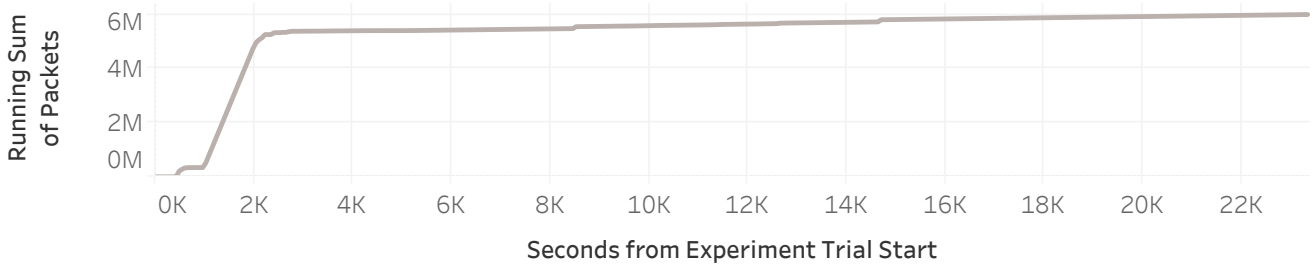
Real Packets per Minute



Real System Interaction Timeline

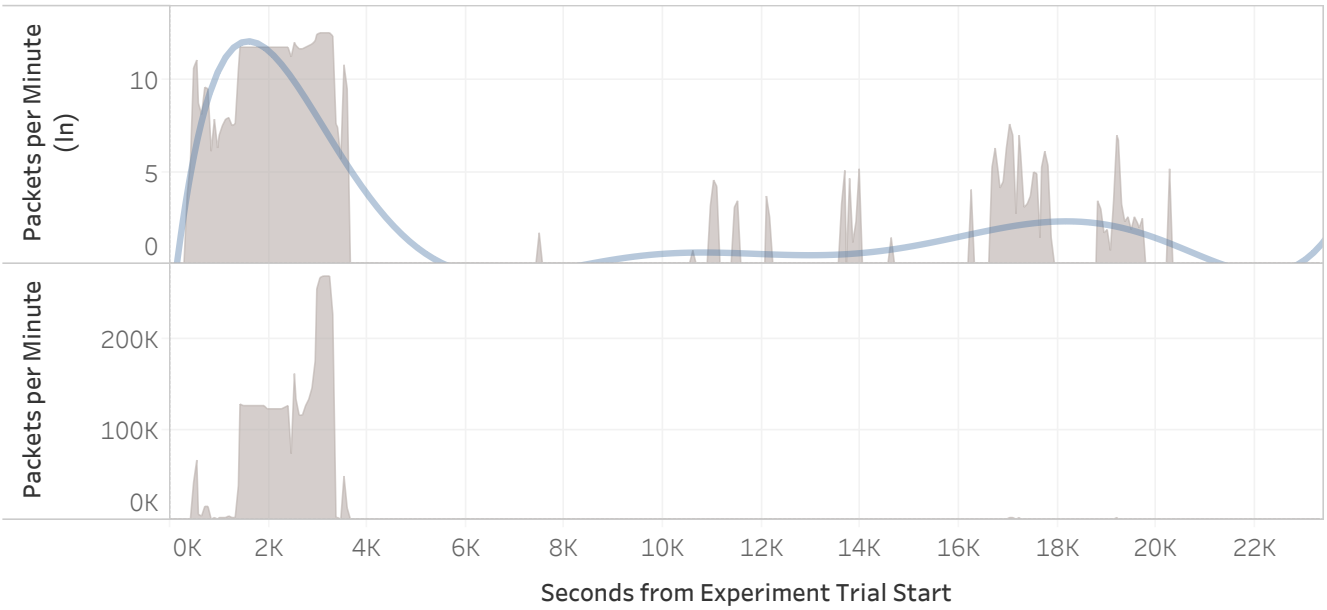


Running Sum of Packets

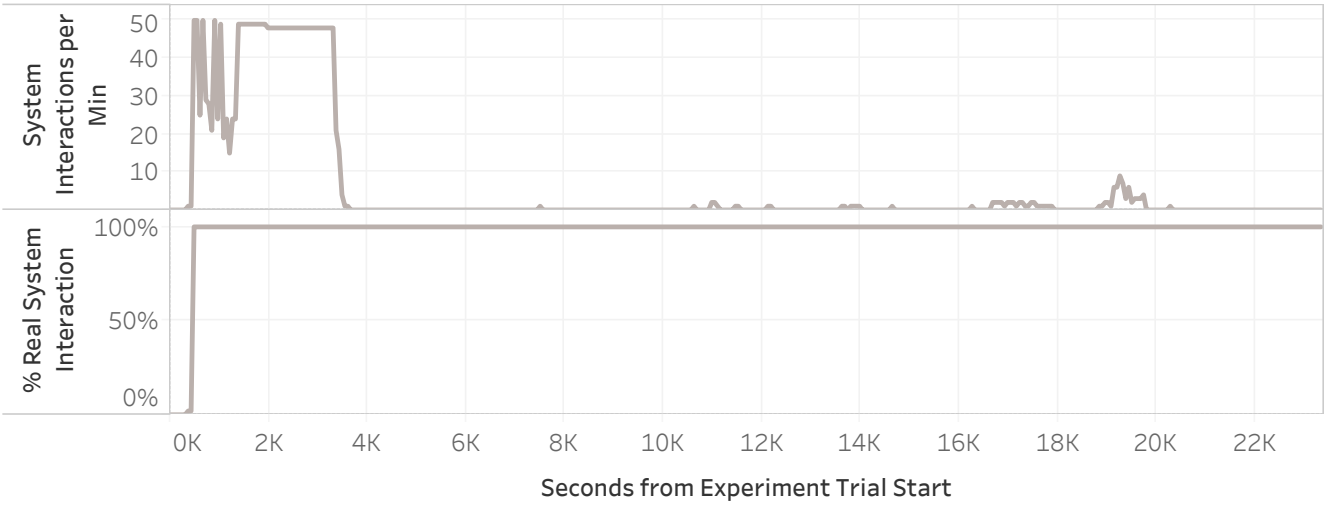


S66 - Day 2 - AIAU

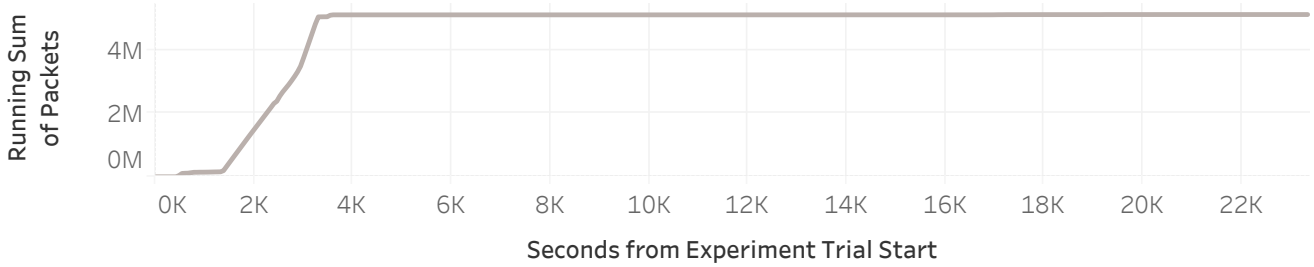
Real Packets per Minute



Real System Interaction Timeline

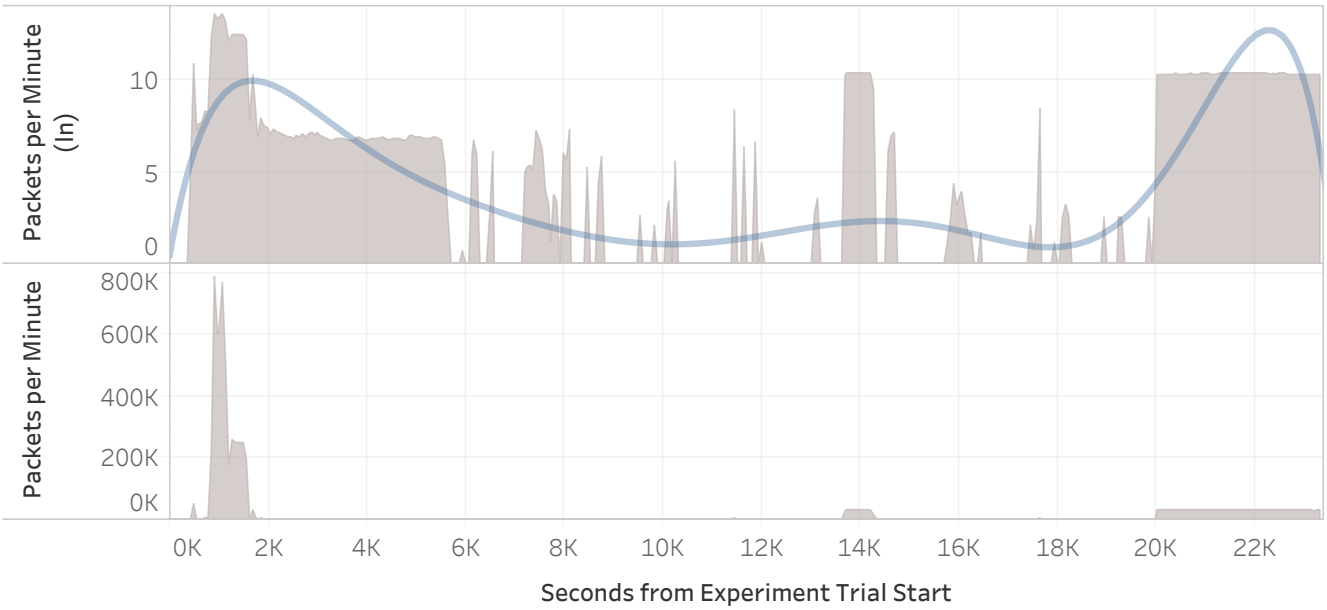


Running Sum of Packets

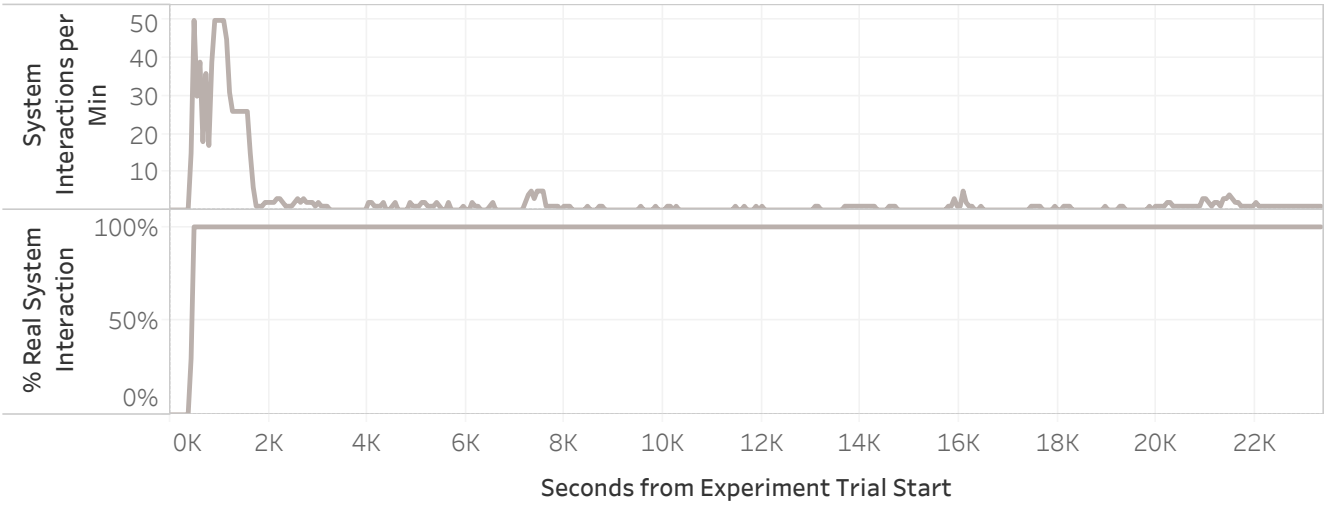


S67 - Day 2 - AIAU

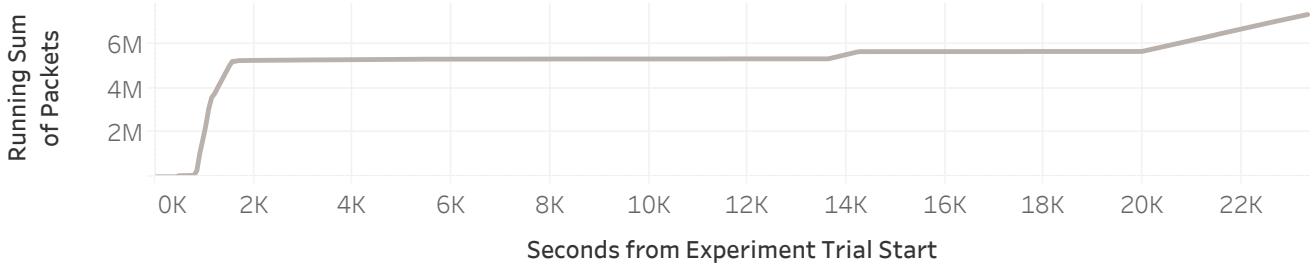
Real Packets per Minute



Real System Interaction Timeline

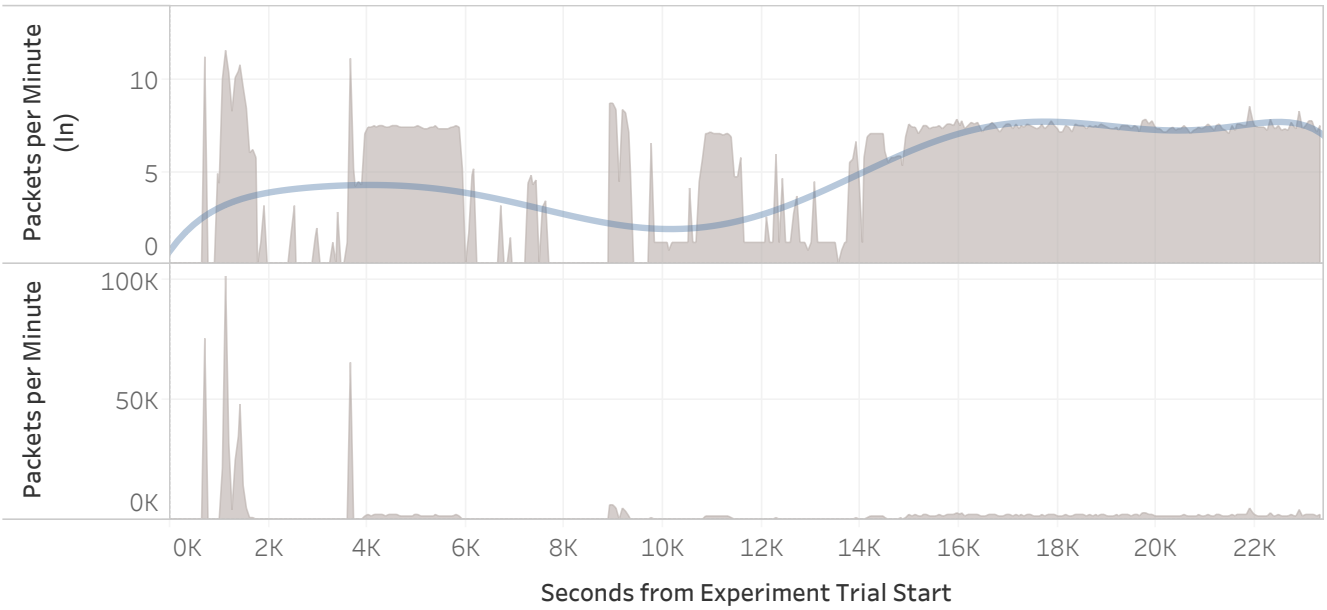


Running Sum of Packets

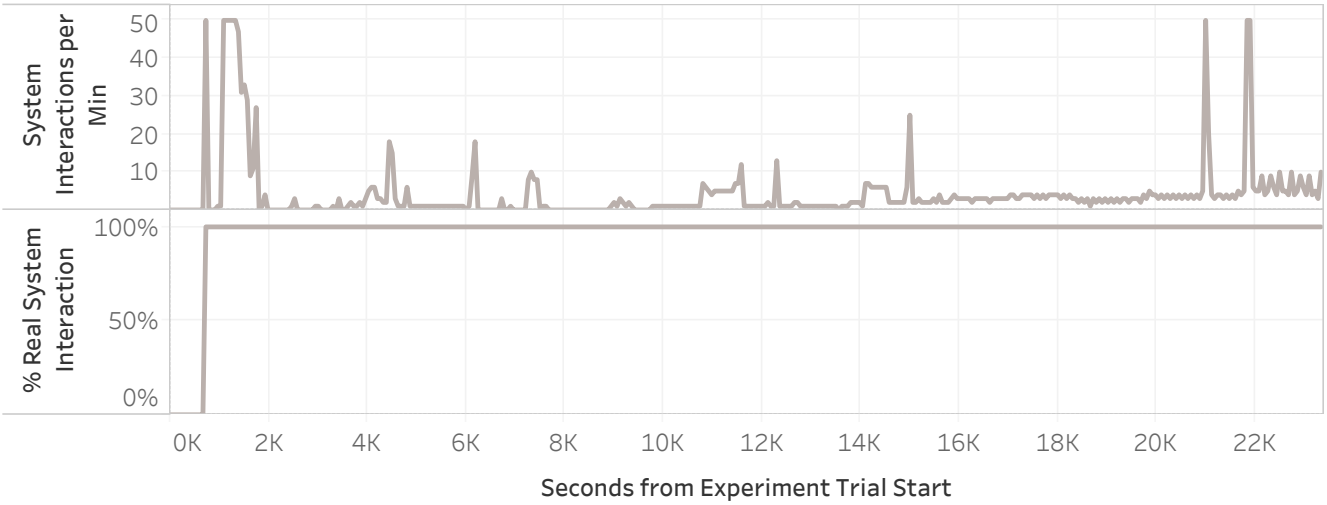


S68 - Day 2 - AIAU

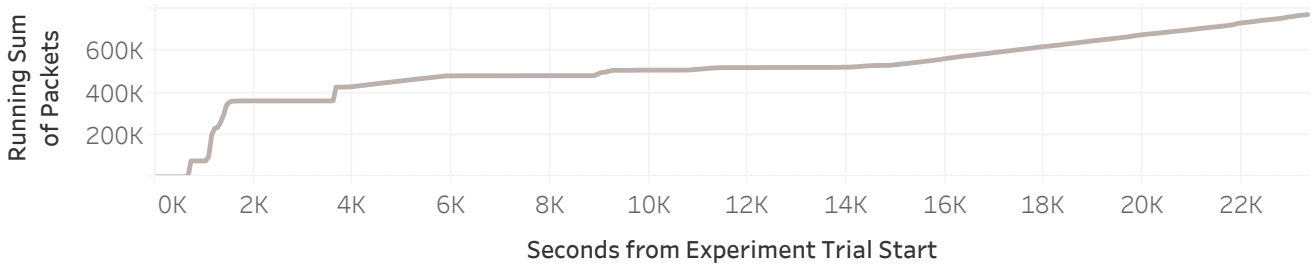
Real Packets per Minute



Real System Interaction Timeline



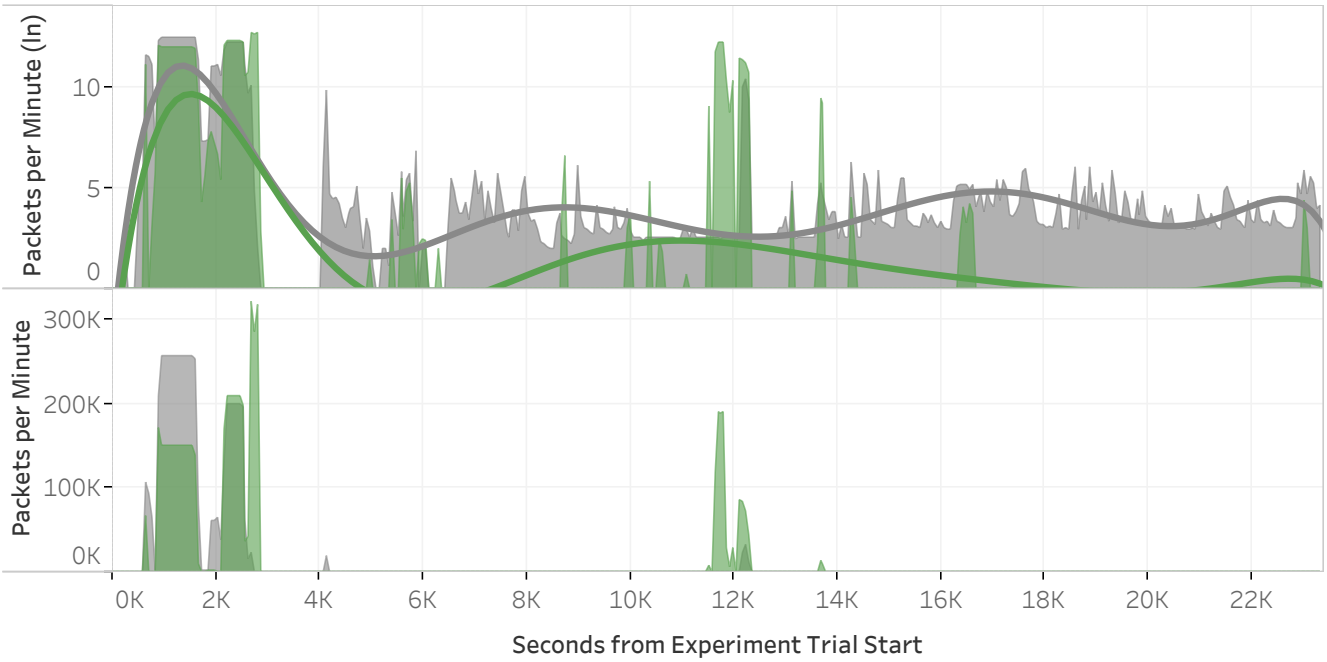
Running Sum of Packets



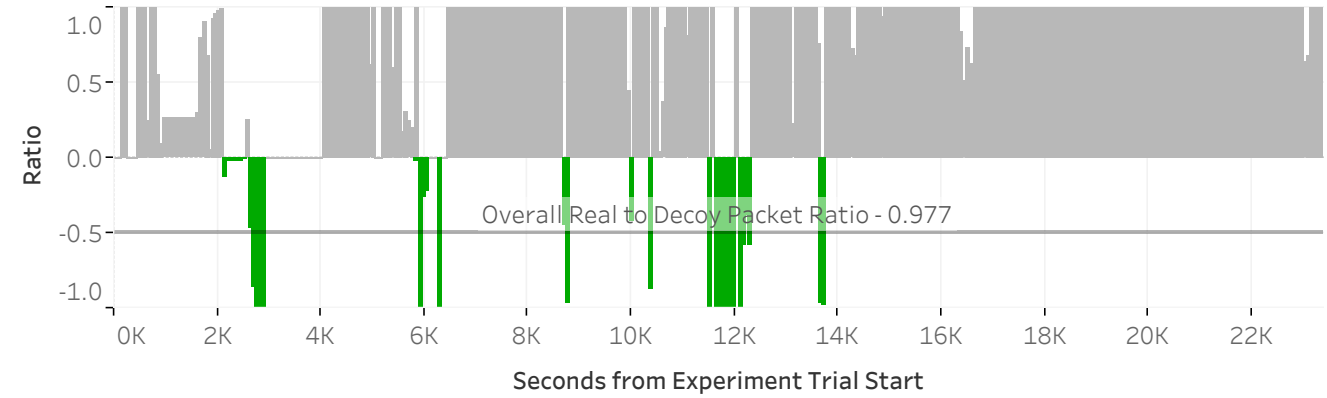
S71 - Day2 - AUPU

Legend
Real Systems
Decoy Systems

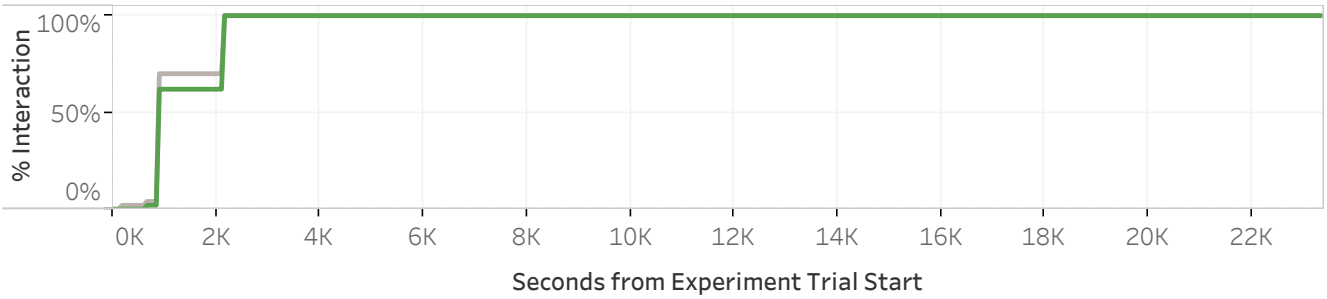
Real & Decoy Packets per Minute

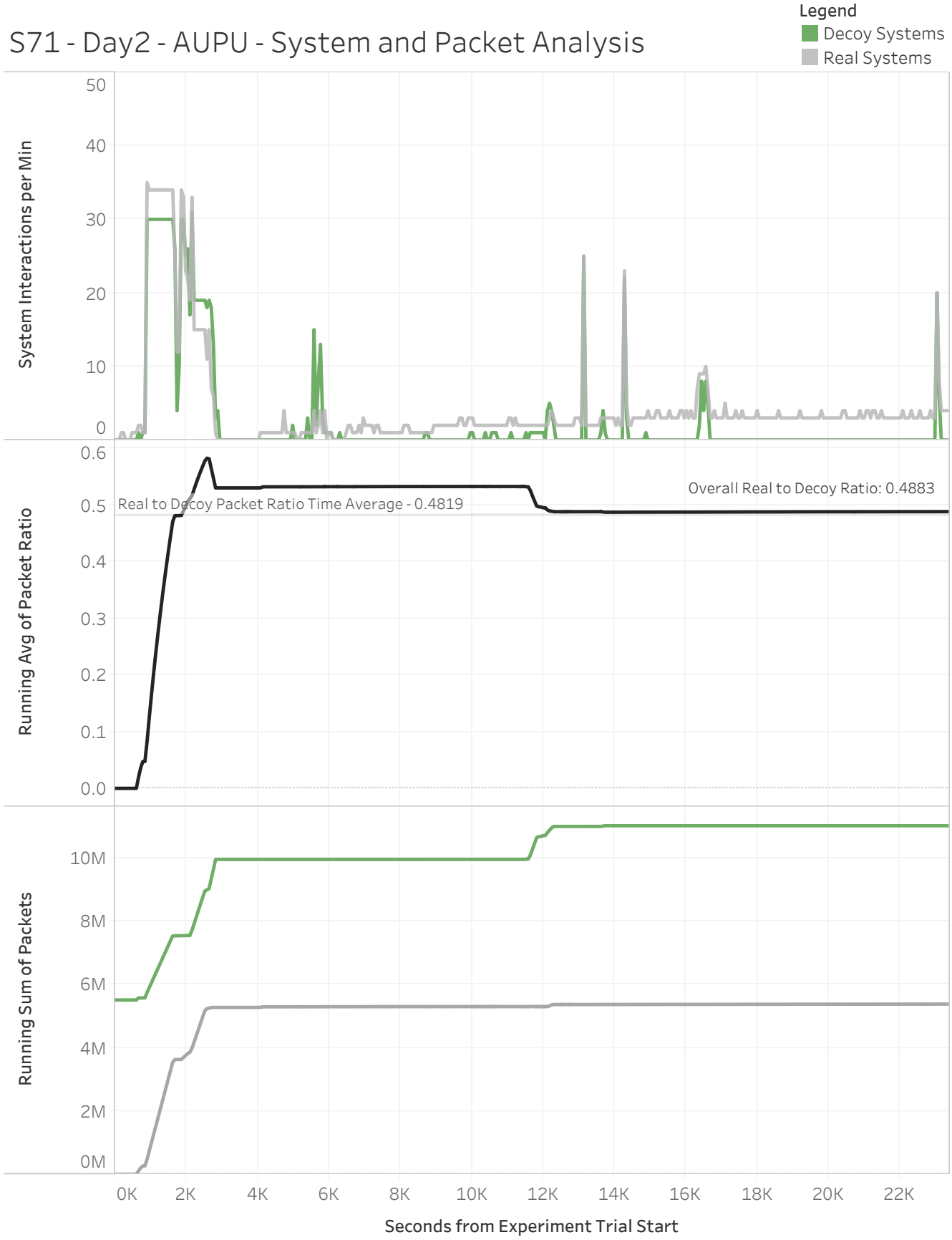


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

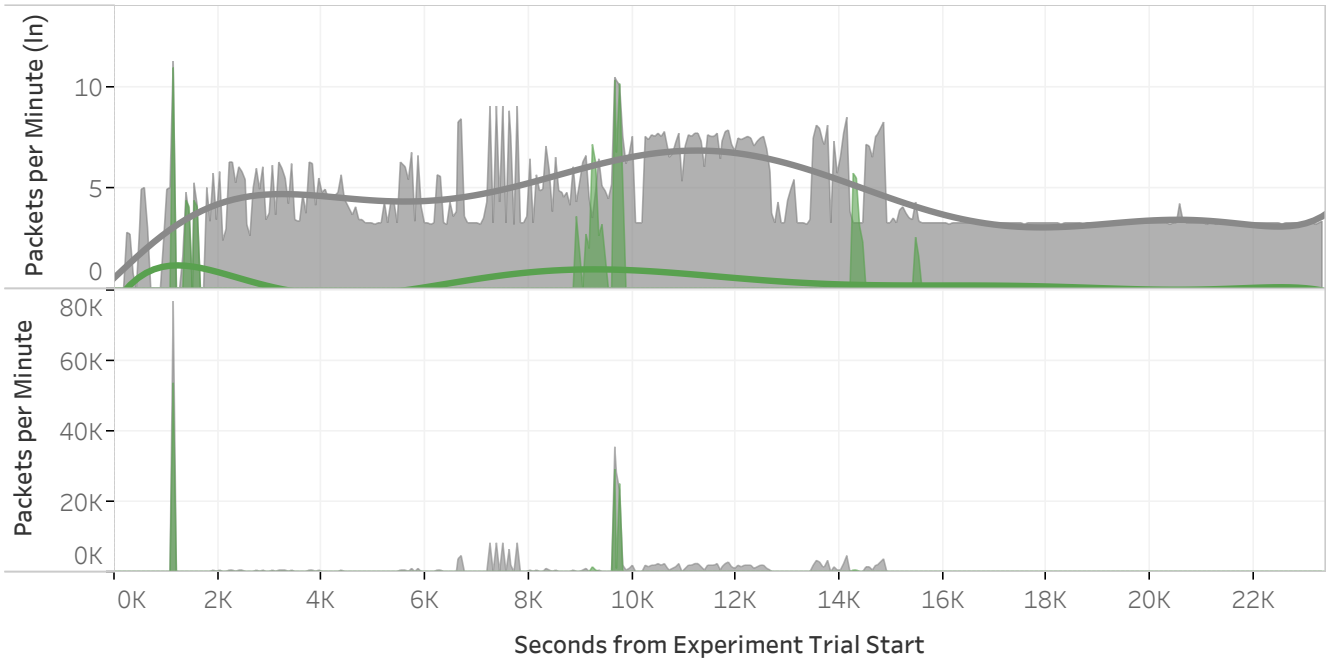



S71 - Day2 - AUPU - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
0.6
0.5
0.4
0.3
0.2
0.1
0.0
Real to Decoy Packet Ratio Time Average - 0.4819
Overall Real to Decoy Ratio: 0.4883
Running Sum of Packets
10M
8M
6M
4M
2M
0M
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

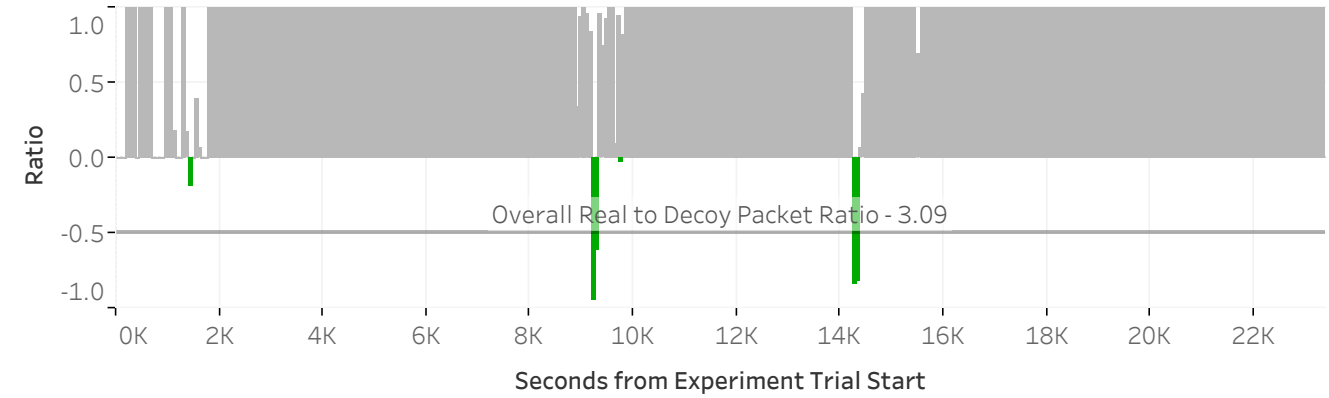
S72 - Day2 - AUPU

Legend
Real Systems
Decoy Systems

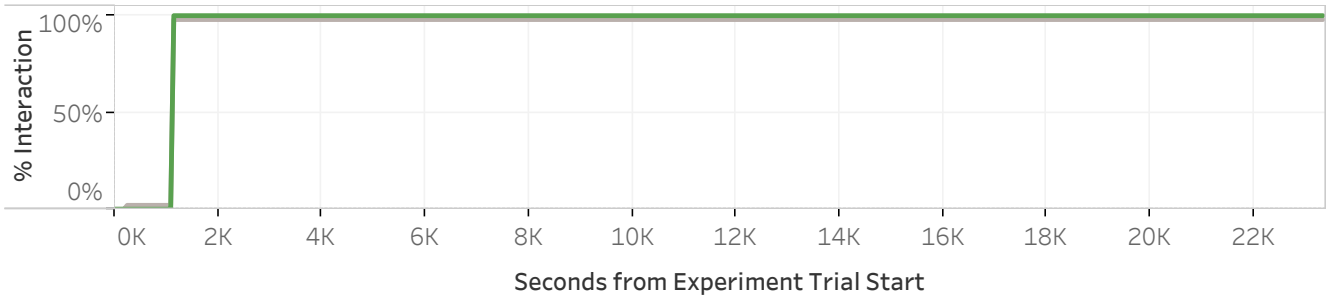
Real & Decoy Packets per Minute

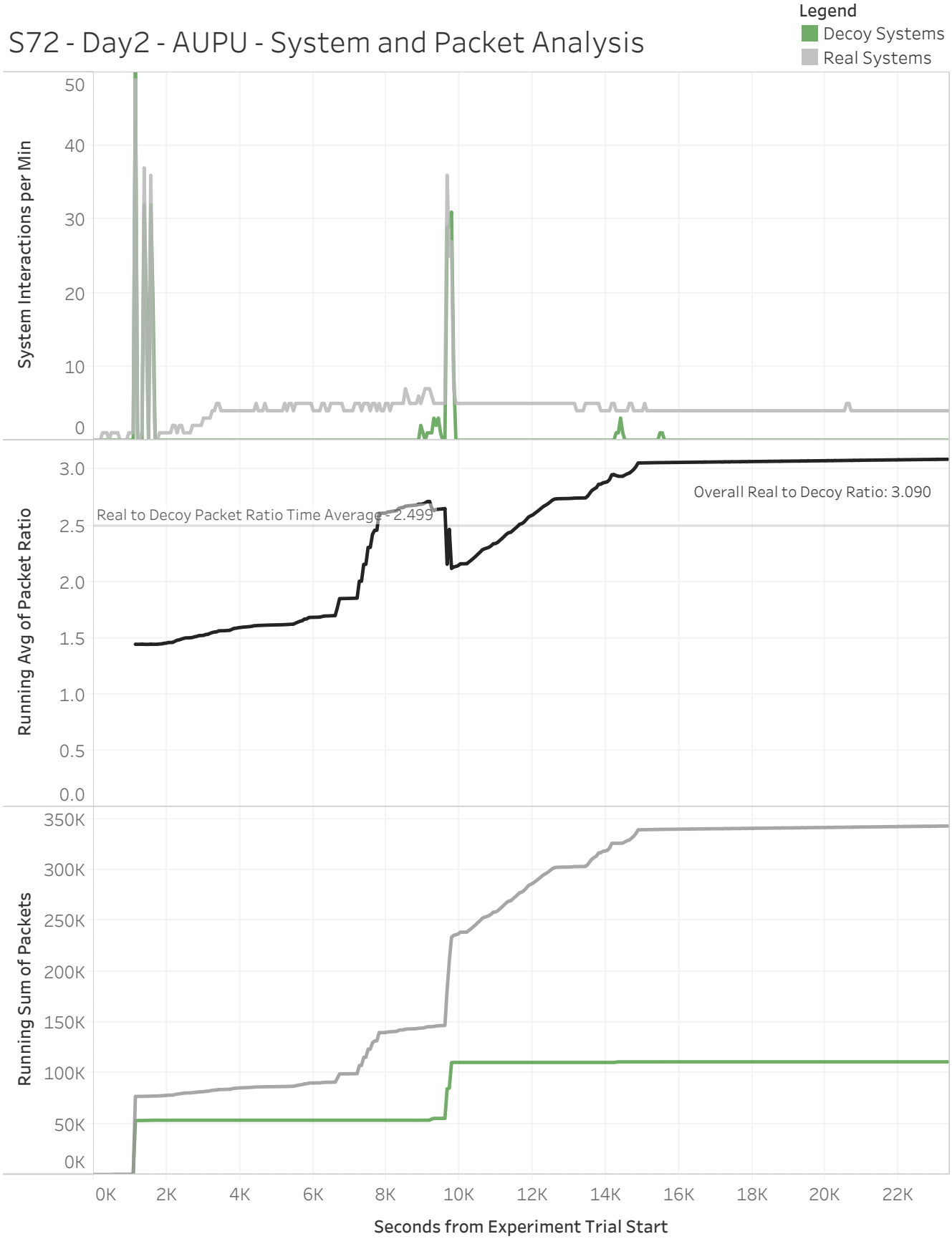


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

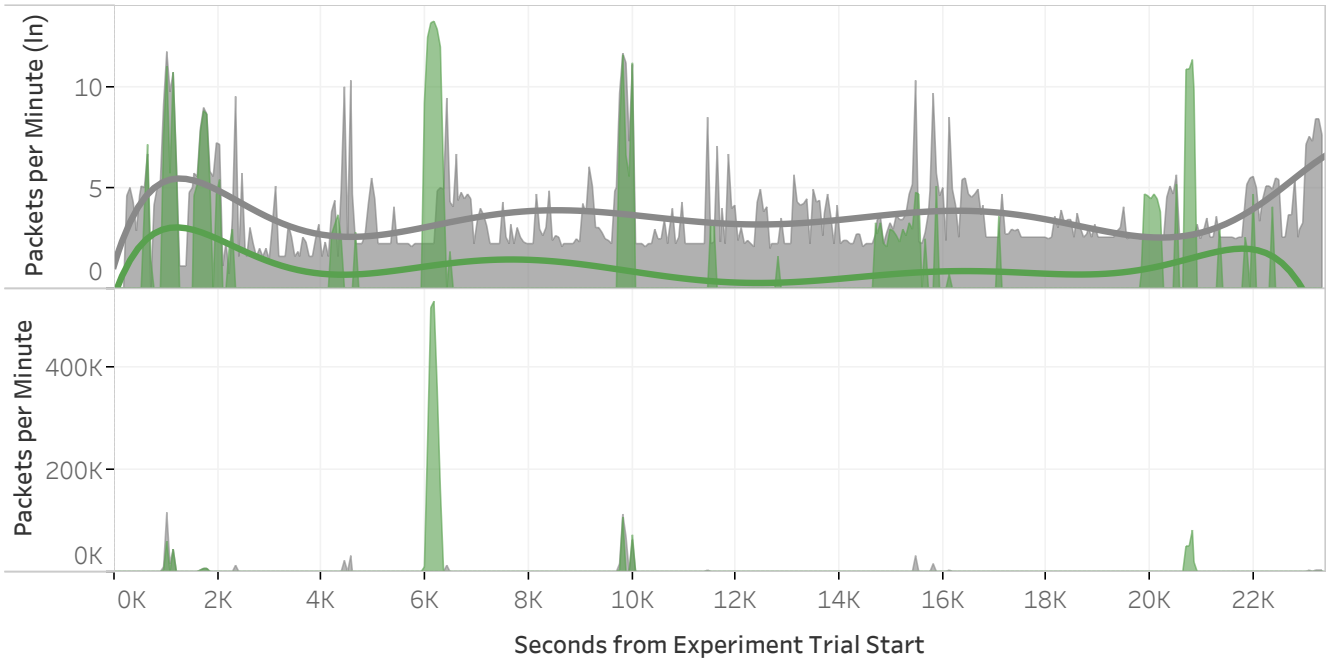



S72 - Day2 - AUPU - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Real to Decoy Packet Ratio Time Average - 2.499
Overall Real to Decoy Ratio: 3.090
Running Sum of Packets
350K
300K
250K
200K
150K
100K
50K
0K
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

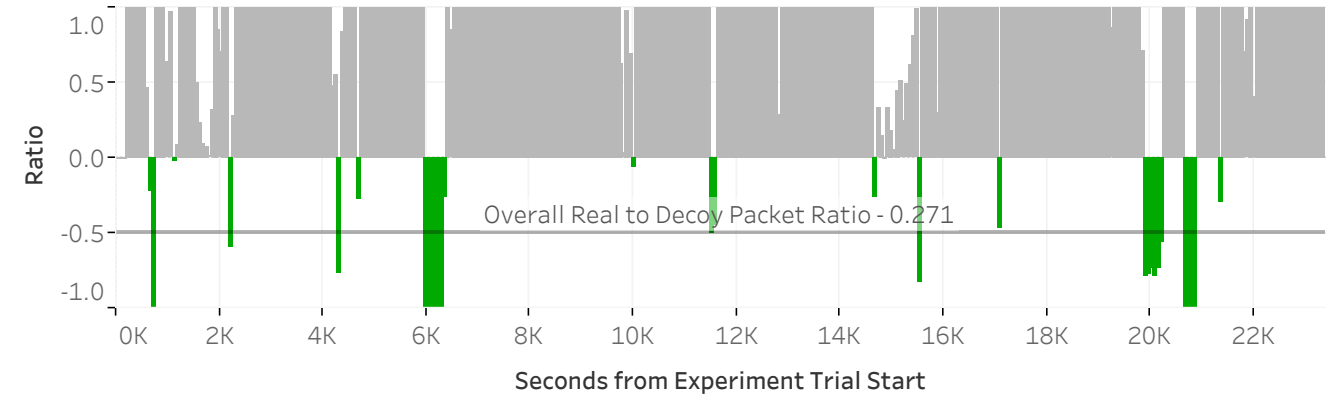
S73 - Day2 - AUPU

Legend
Real Systems
Decoy Systems

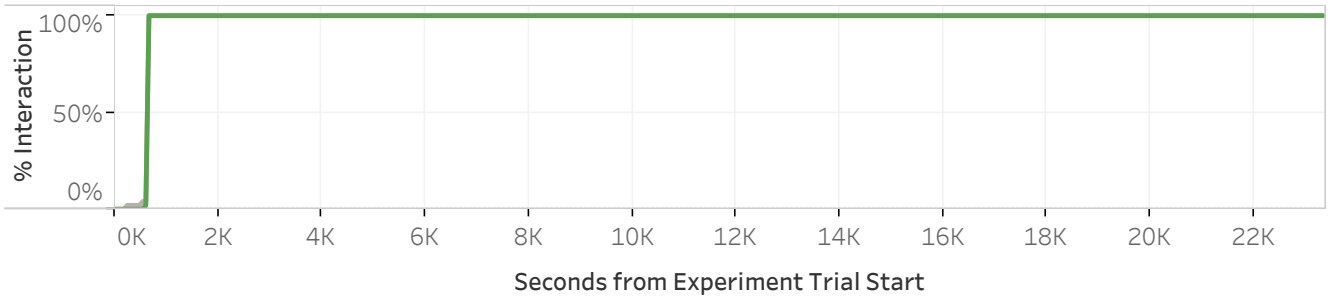
Real & Decoy Packets per Minute

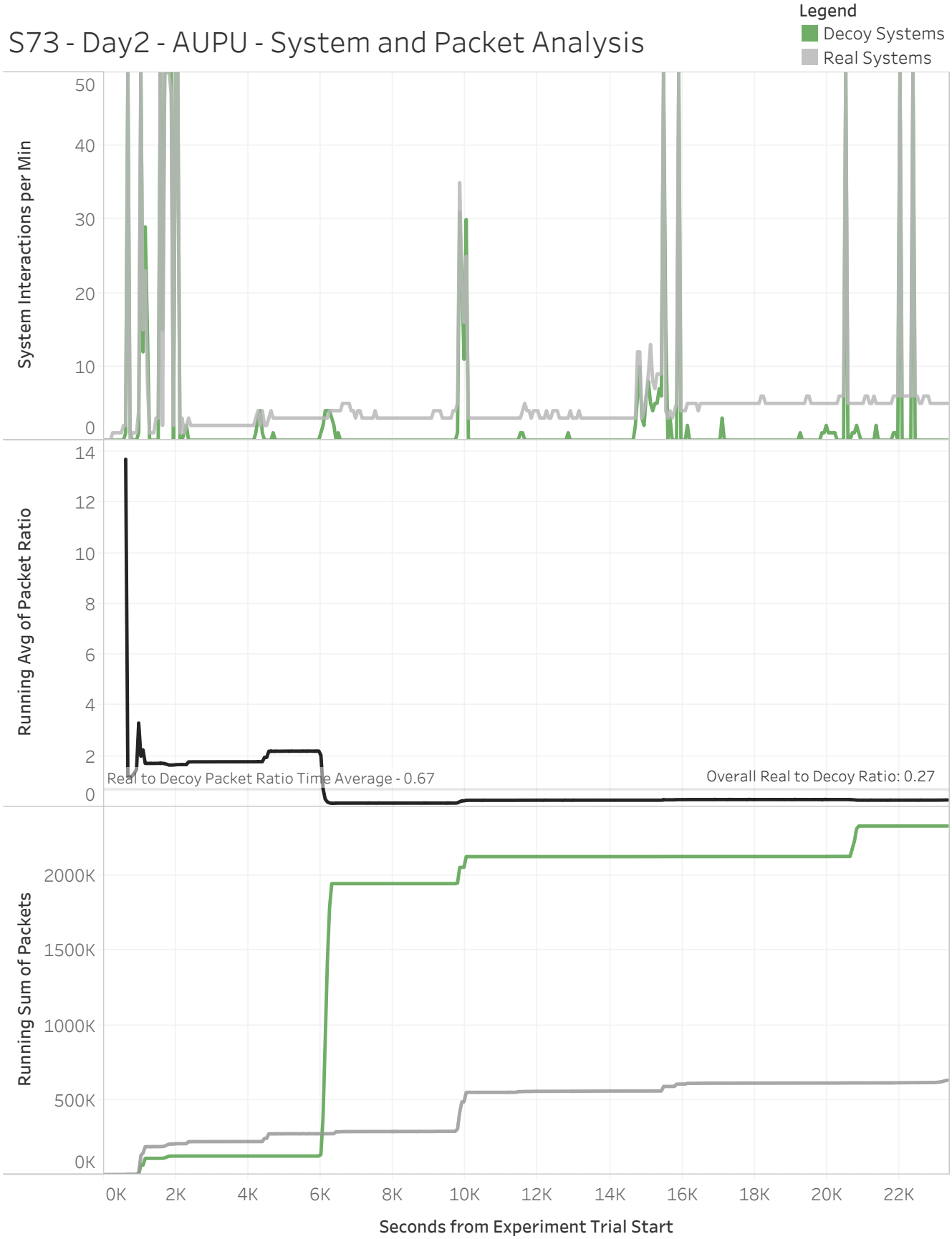


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

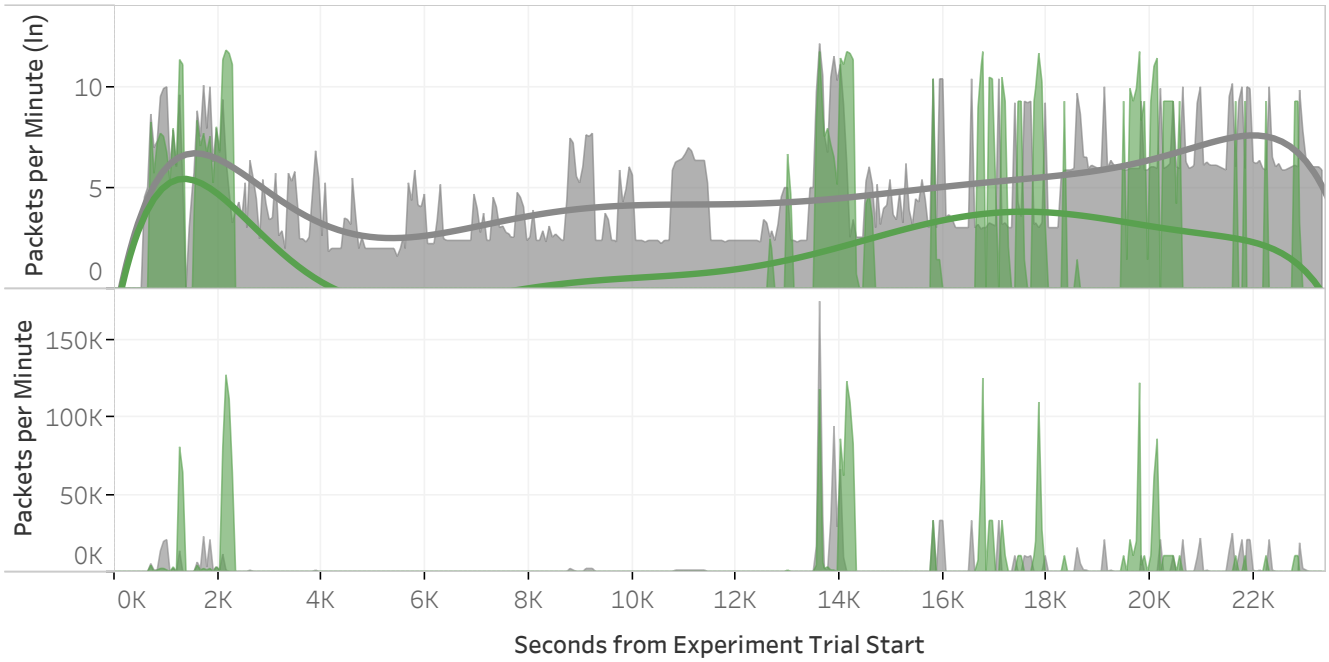



S73 - Day2 - AUPU - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
14
12
10
8
6
4
2
0
Real to Decoy Packet Ratio Time Average - 0.67
Overall Real to Decoy Ratio: 0.27
Running Sum of Packets
2000K
1500K
1000K
500K
0K
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

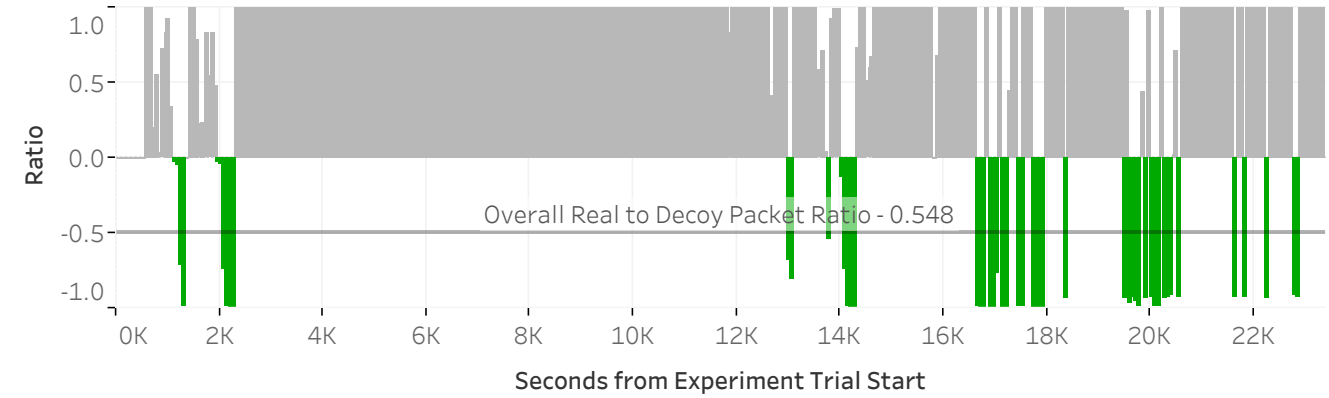
S74 - Day2 - AUPU

Legend
Real Systems
Decoy Systems

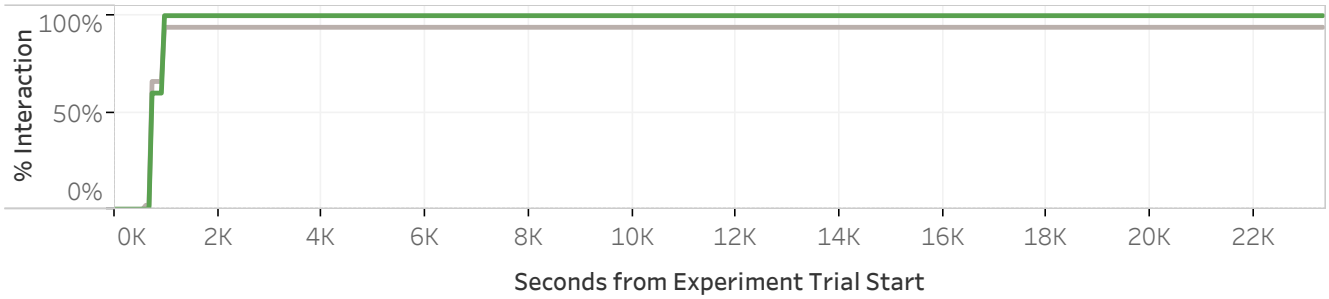
Real & Decoy Packets per Minute

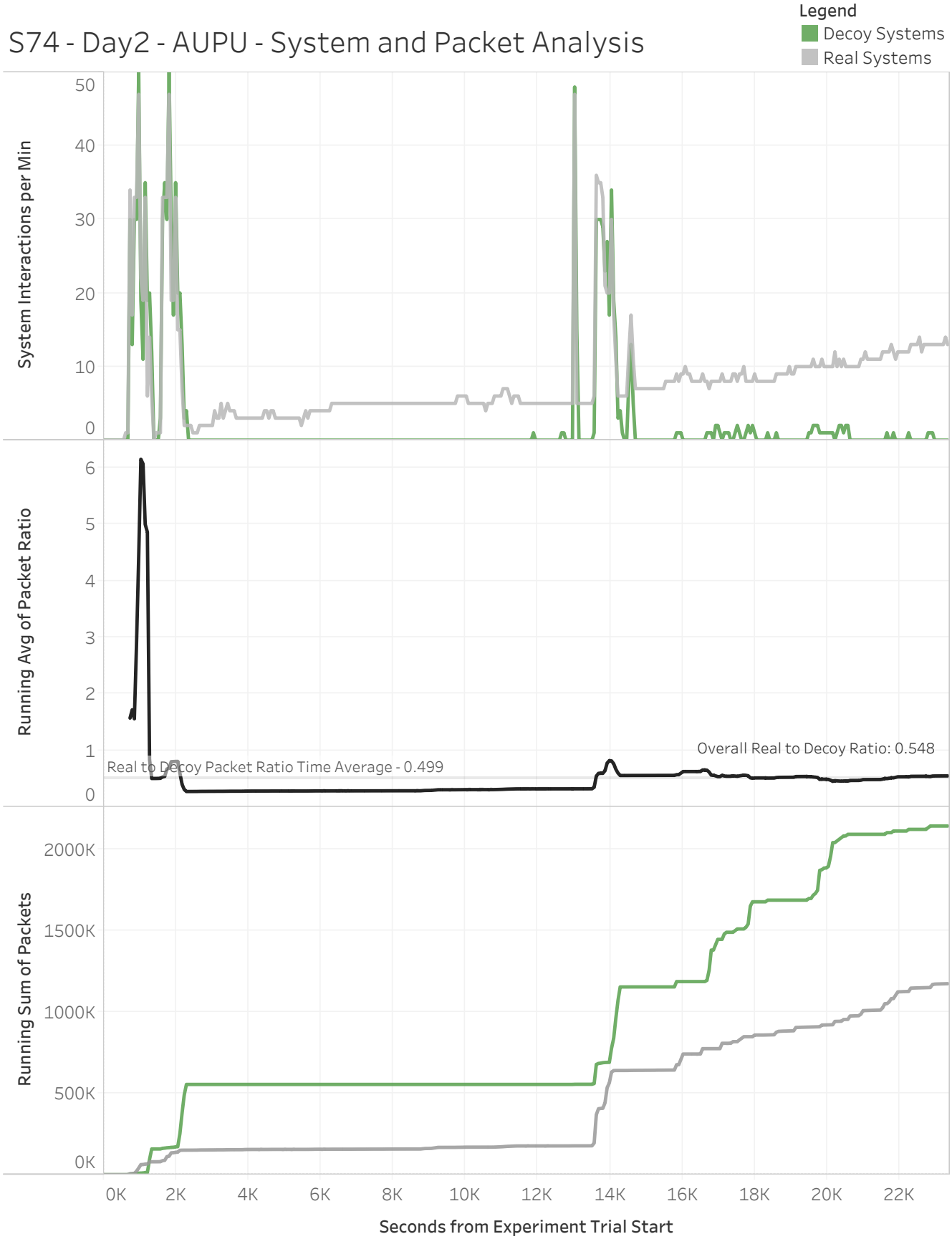


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

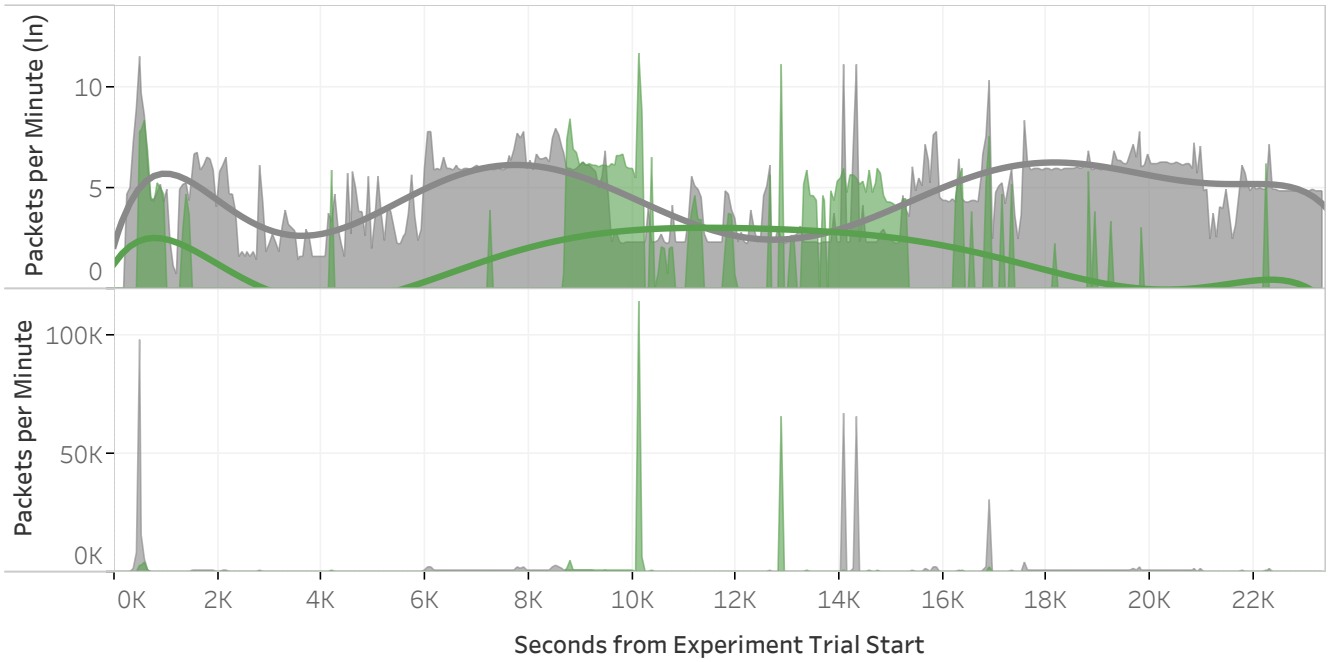



S74 - Day2 - AUPU - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
6
5
4
3
2
1
0
Real to Decoy Packet Ratio Time Average - 0.499
Overall Real to Decoy Ratio: 0.548
Running Sum of Packets
2000K
1500K
1000K
500K
0K
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

S75 - Day2 - AUPU

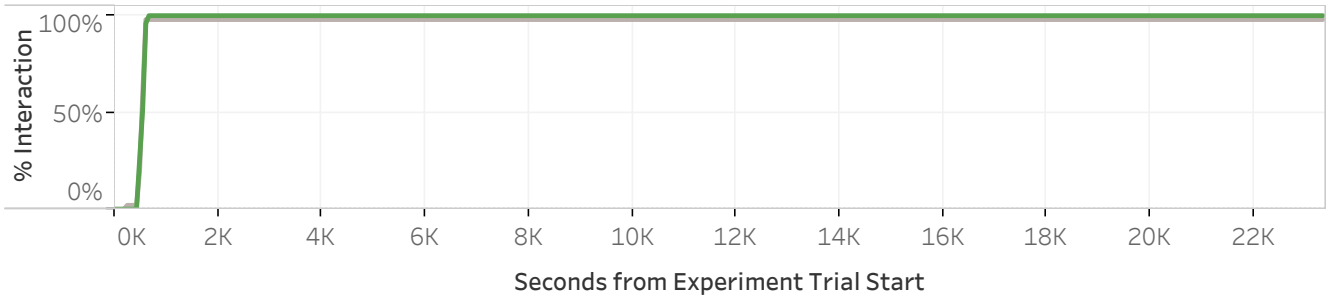
Legend
Real Systems
Decoy Systems

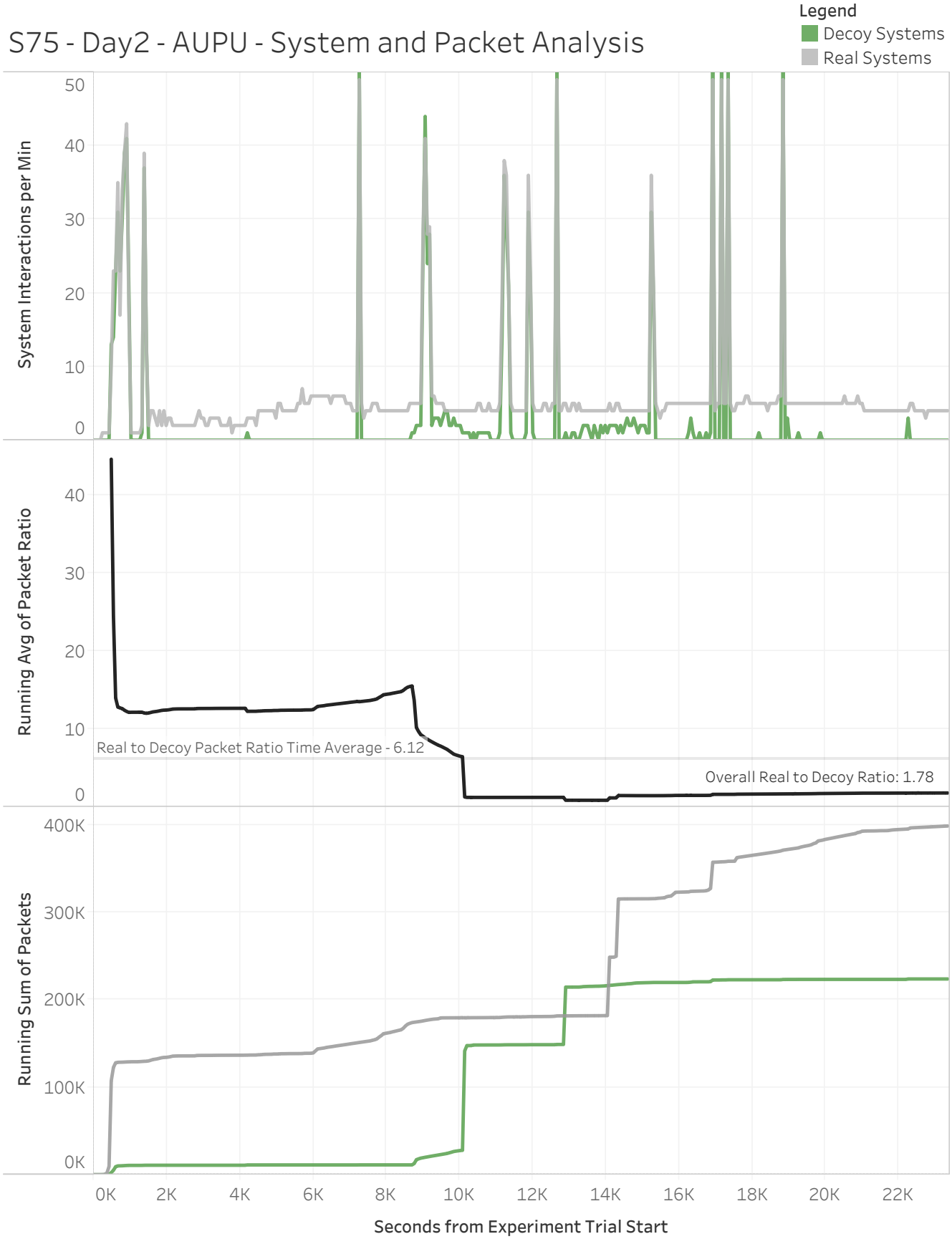
Real & Decoy Packets per Minute



Real to Decoy Packet Ratio

Real & Decoy System Interaction Timeline

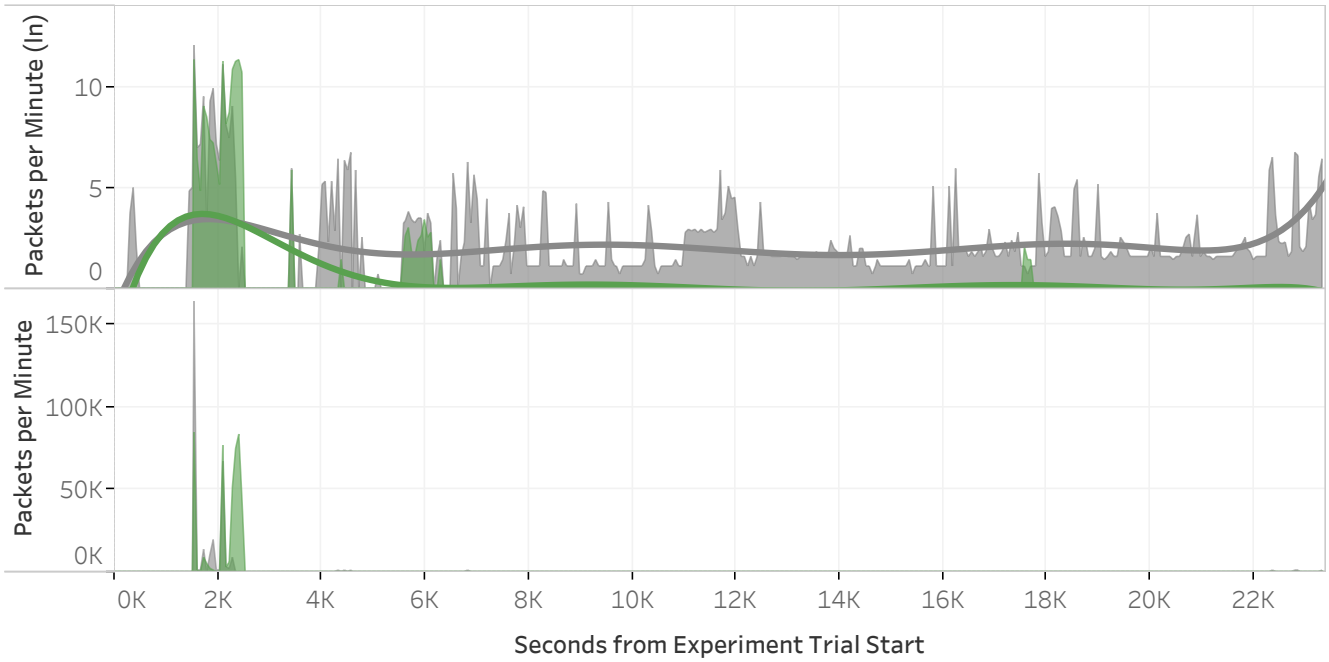



S75 - Day2 - AUPU - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
40
30
20
10
0
Real to Decoy Packet Ratio Time Average - 6.12
Overall Real to Decoy Ratio: 1.78
Running Sum of Packets
400K
300K
200K
100K
0K
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

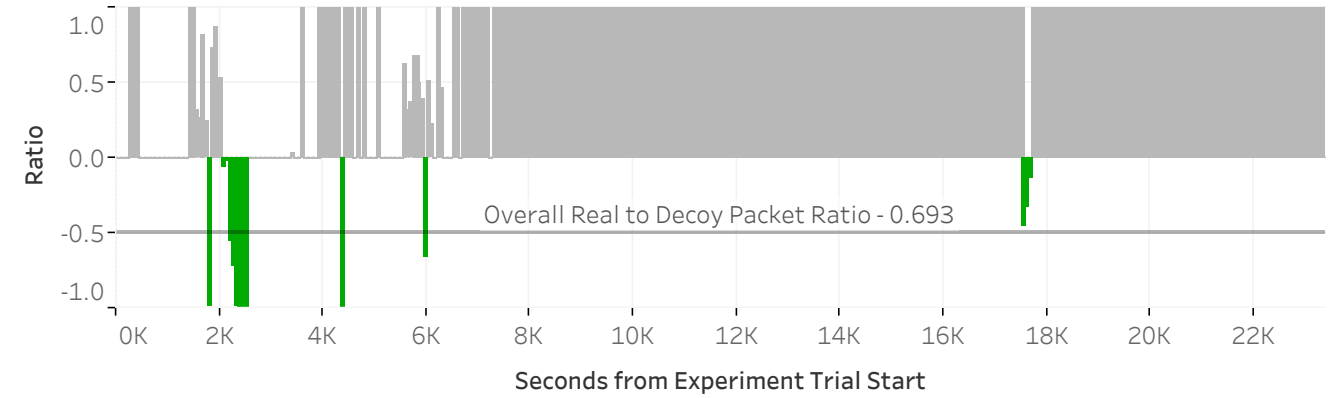
S76 - Day2 - AUPU

Legend
Real Systems
Decoy Systems

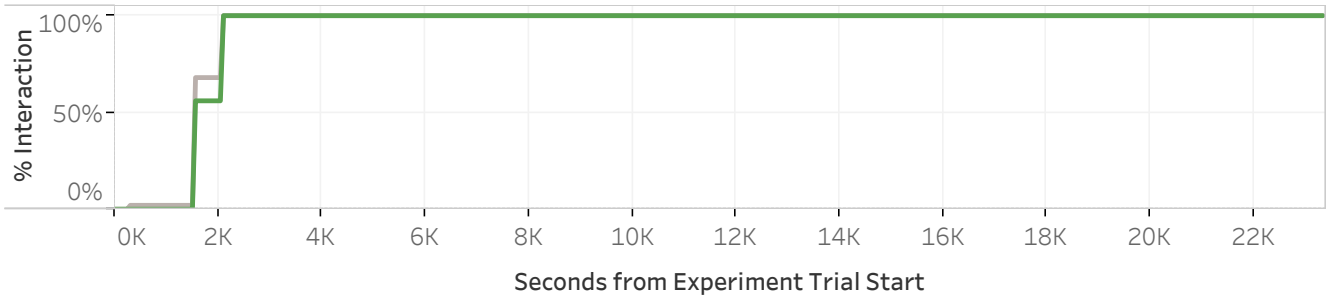
Real & Decoy Packets per Minute

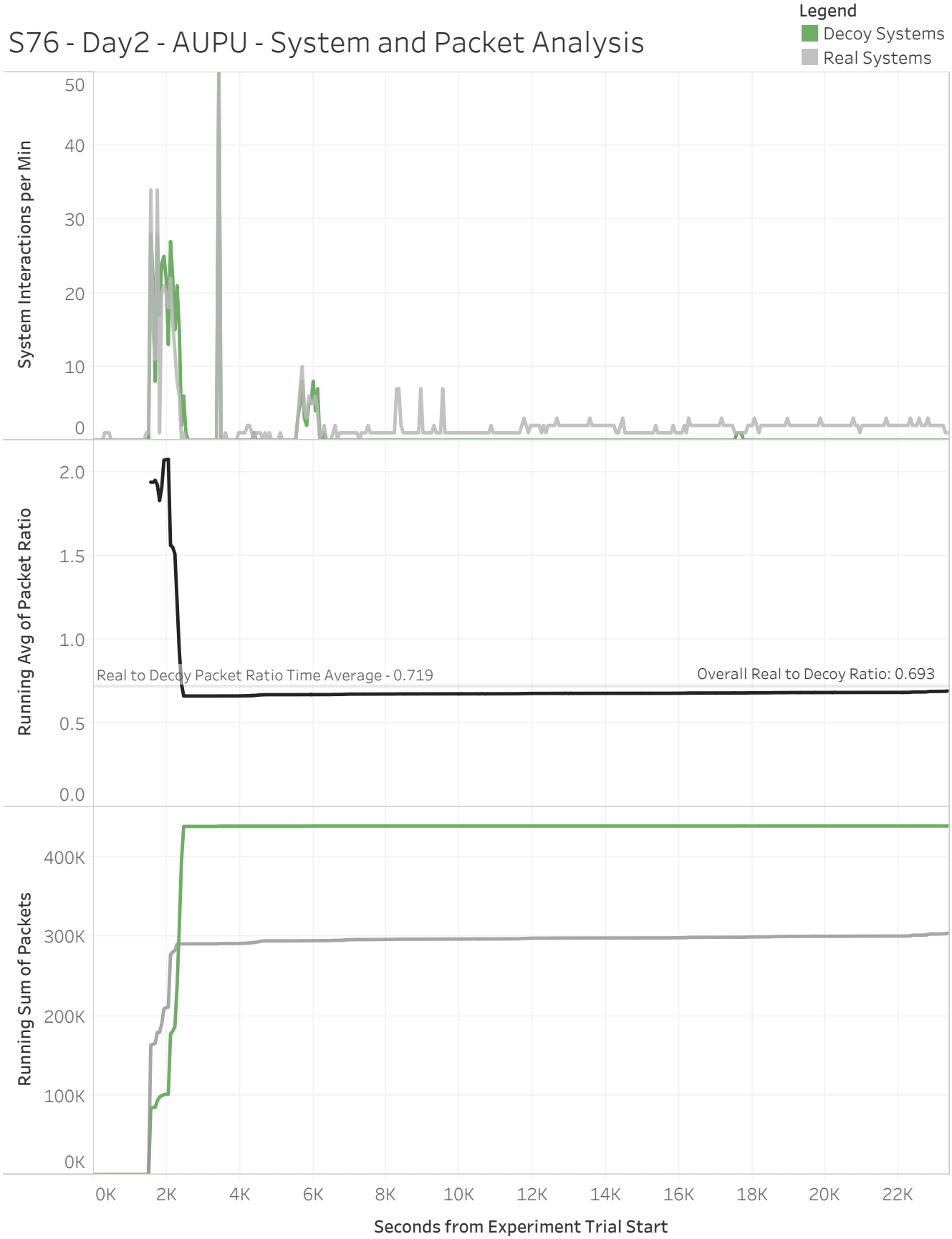


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

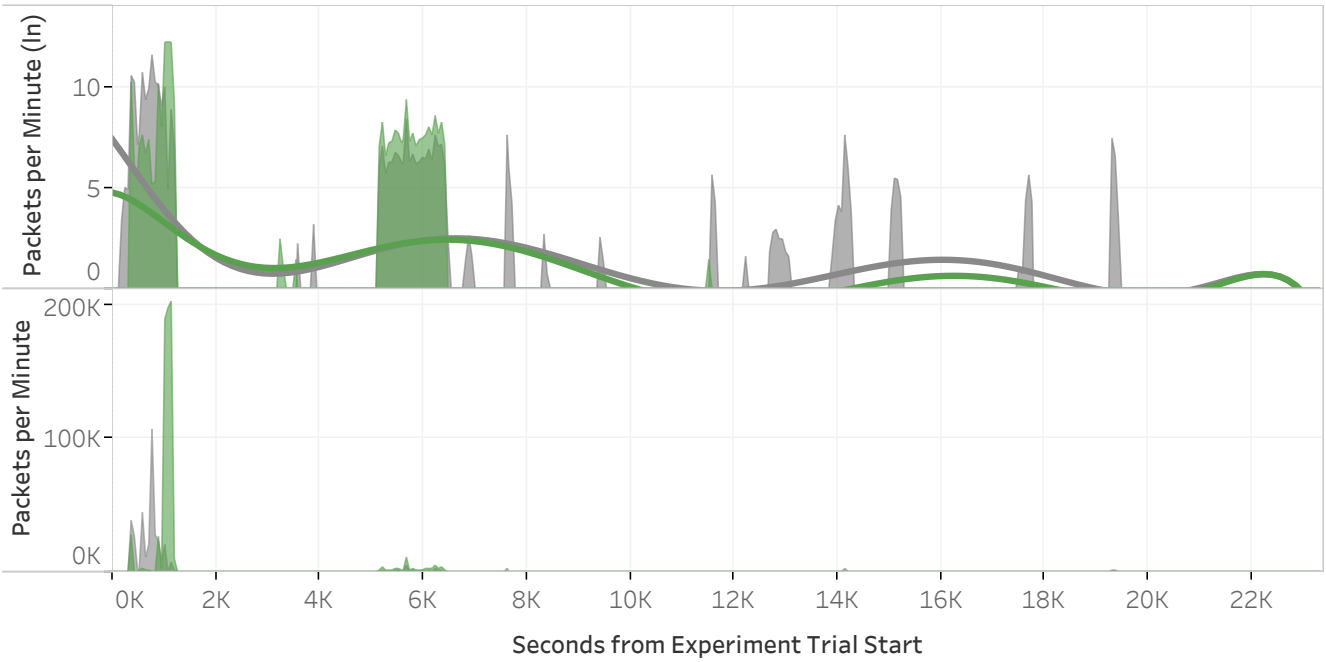



S76 - Day2 - AUPU - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
2.0
1.5
1.0
0.5
0.0
Real to Decoy Packet Ratio Time Average - 0.719
Overall Real to Decoy Ratio: 0.693
Running Sum of Packets
400K
300K
200K
100K
0K
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

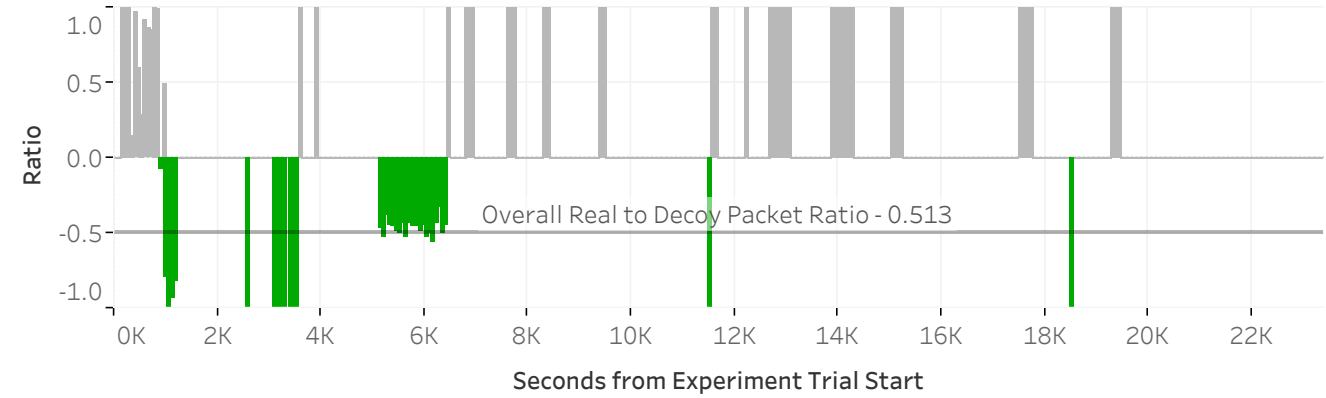
S77 - Day2 - AUPU

Legend
Real Systems
Decoy Systems

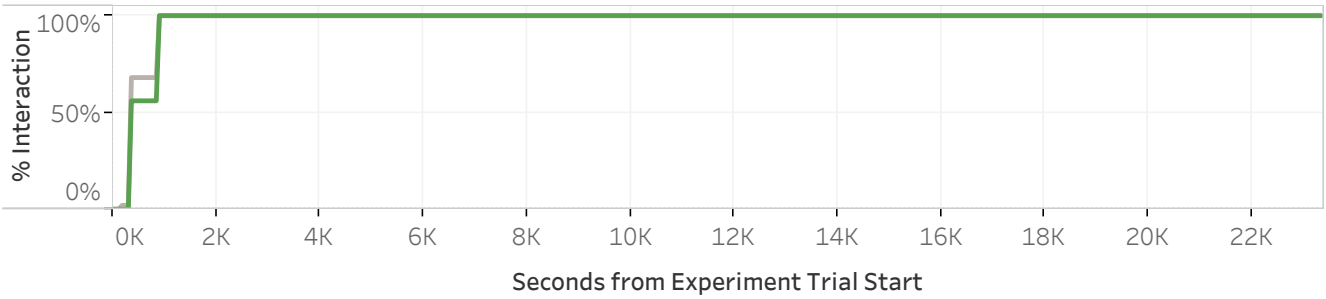
Real & Decoy Packets per Minute

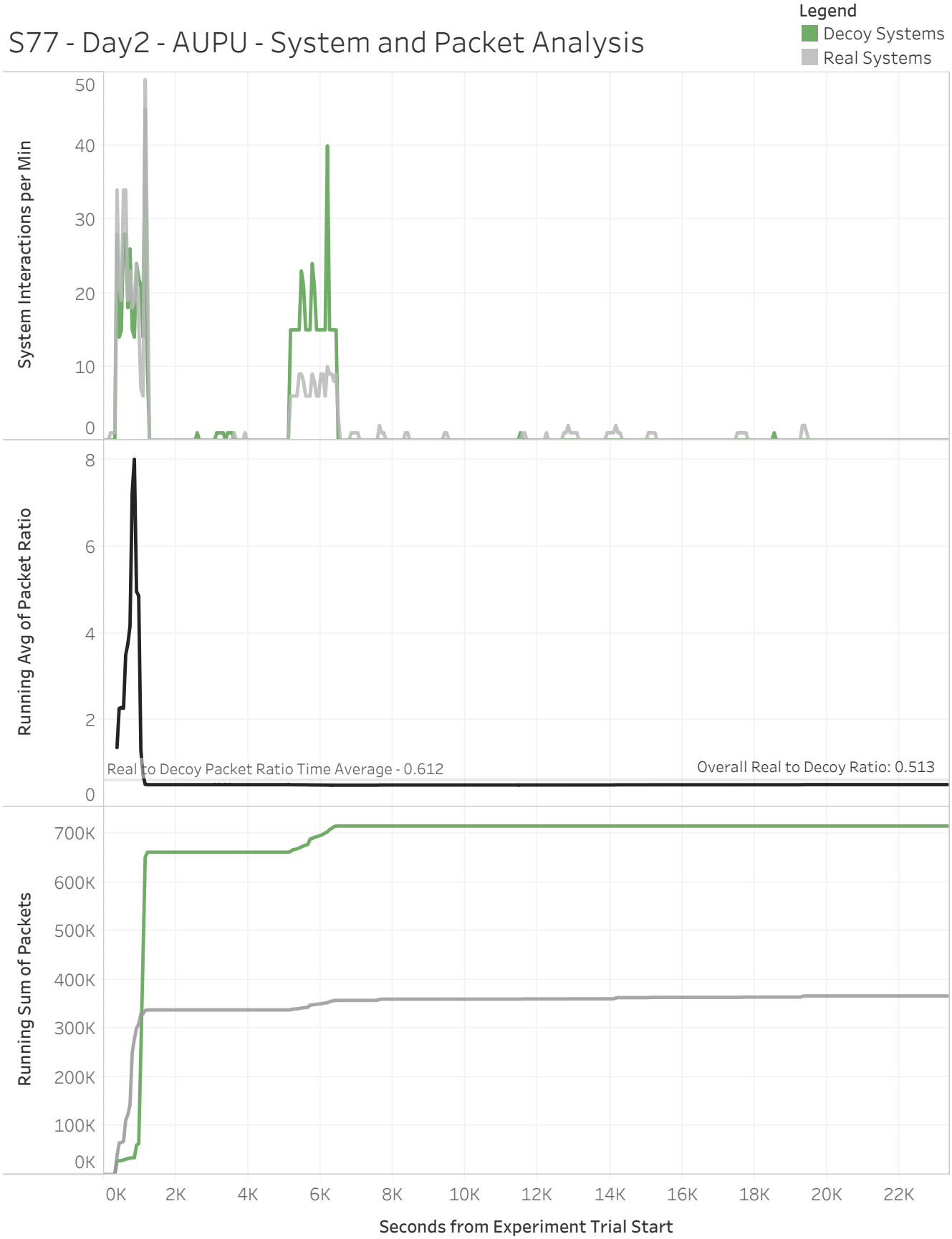


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

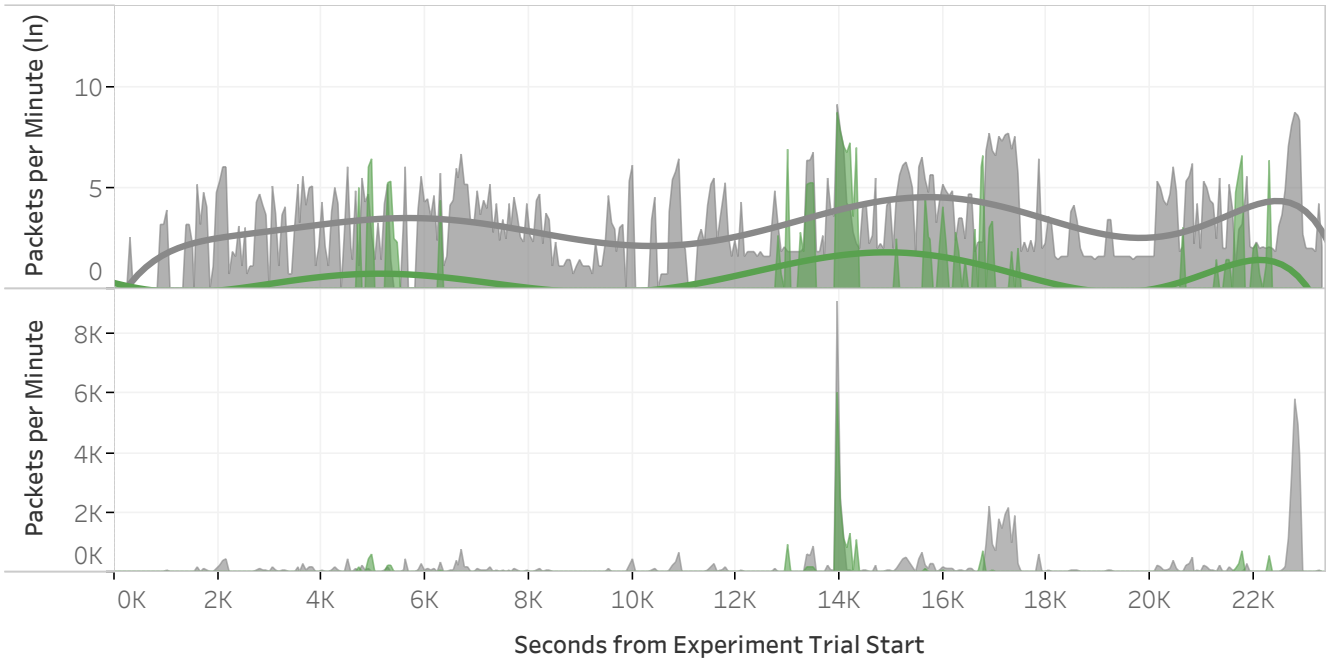



S77 - Day2 - AUPU - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
8
6
4
2
0
Real to Decoy Packet Ratio Time Average - 0.612
Overall Real to Decoy Ratio: 0.513
Running Sum of Packets
700K
600K
500K
400K
300K
200K
100K
0K
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

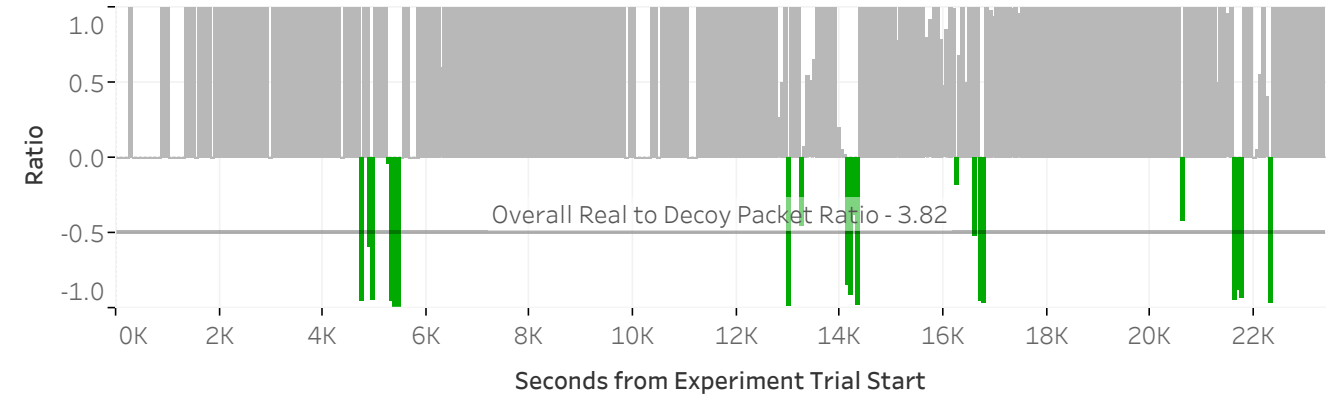
S78 - Day2 - AUPU

Legend
Real Systems
Decoy Systems

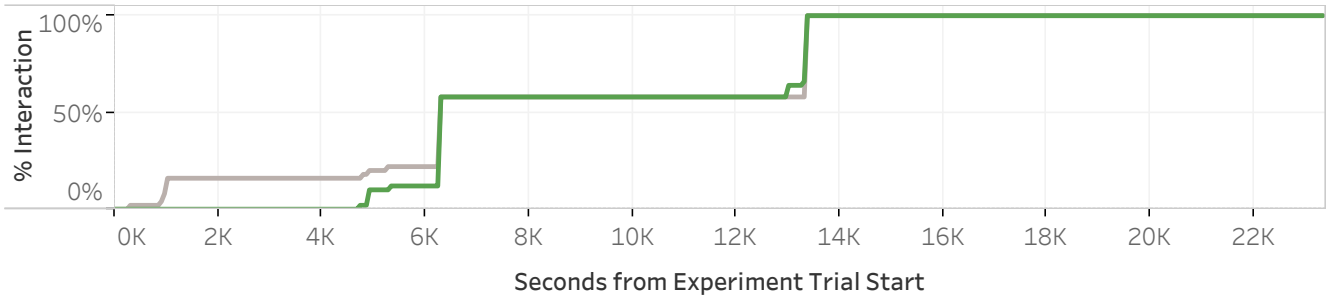
Real & Decoy Packets per Minute

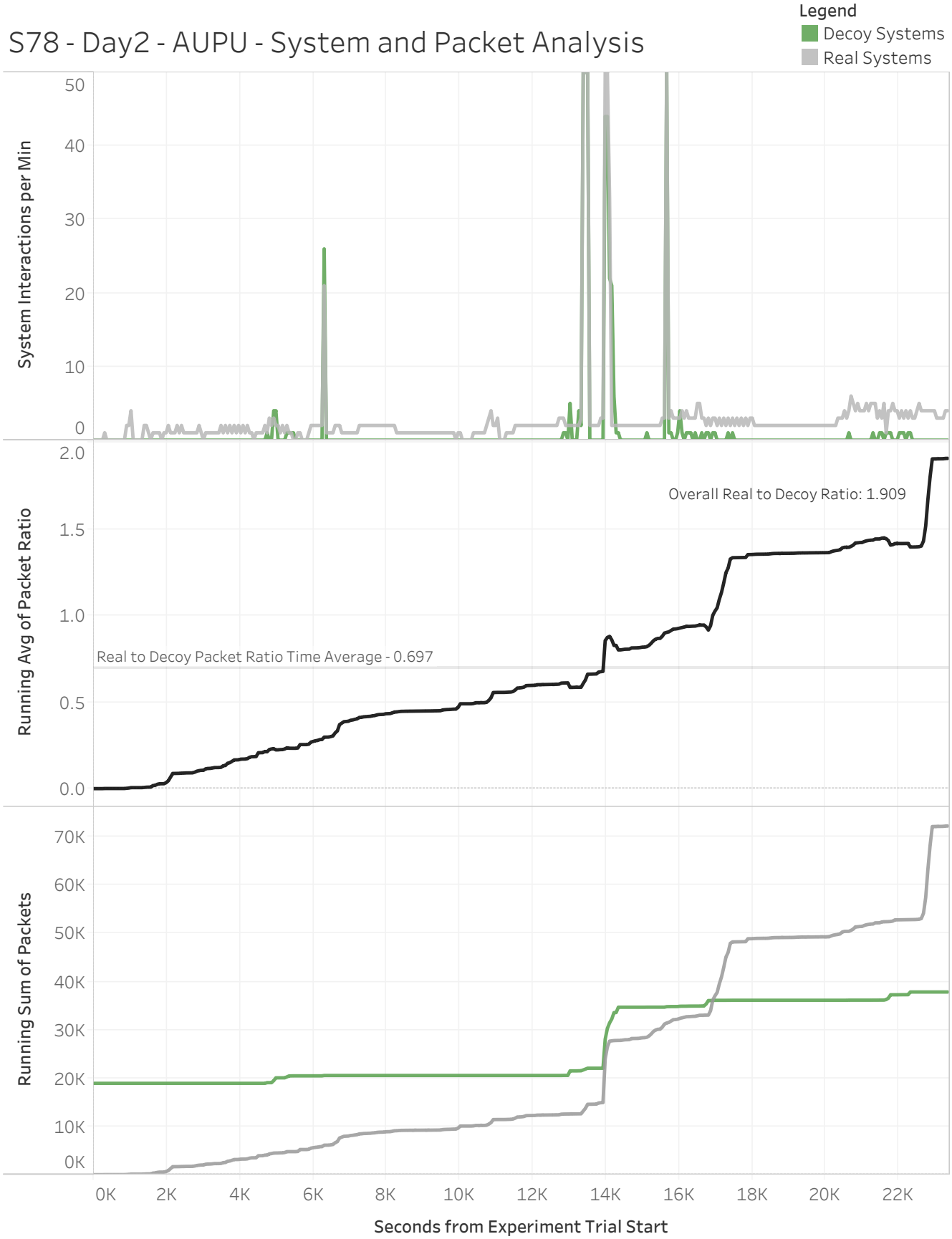


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

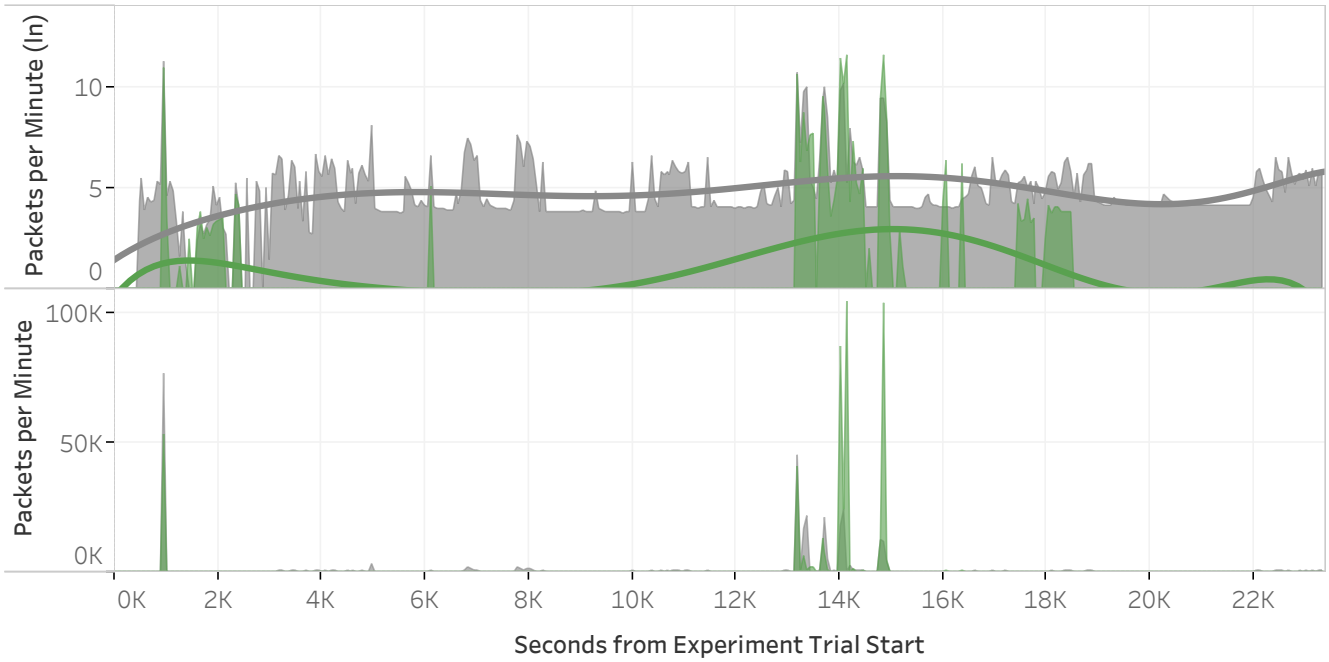



S78 - Day2 - AUPU - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
2.0
1.5
1.0
0.5
0.0
Overall Real to Decoy Ratio: 1.909
Real to Decoy Packet Ratio Time Average - 0.697
Running Sum of Packets
70K
60K
50K
40K
30K
20K
10K
0K
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

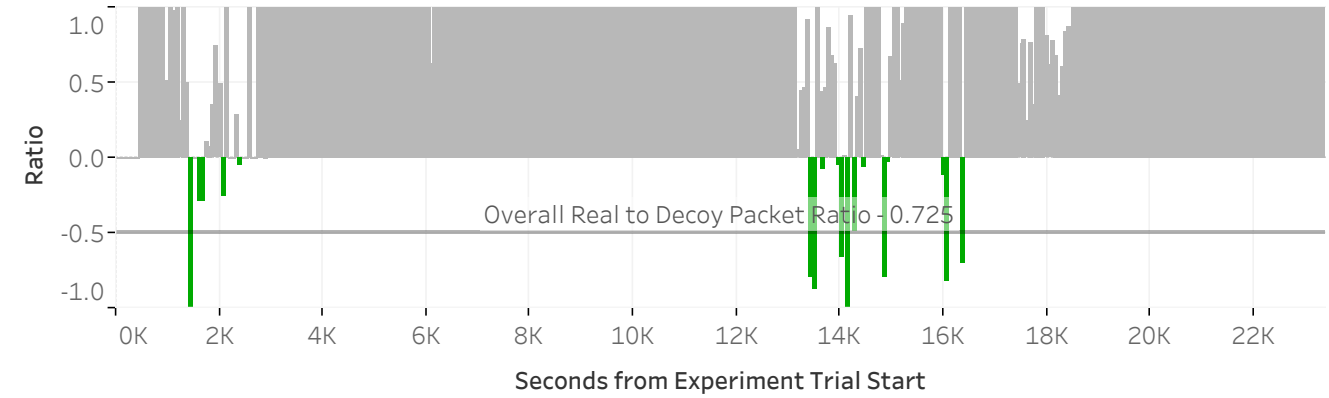
S79 - Day2 - AUPU

Legend
Real Systems
Decoy Systems

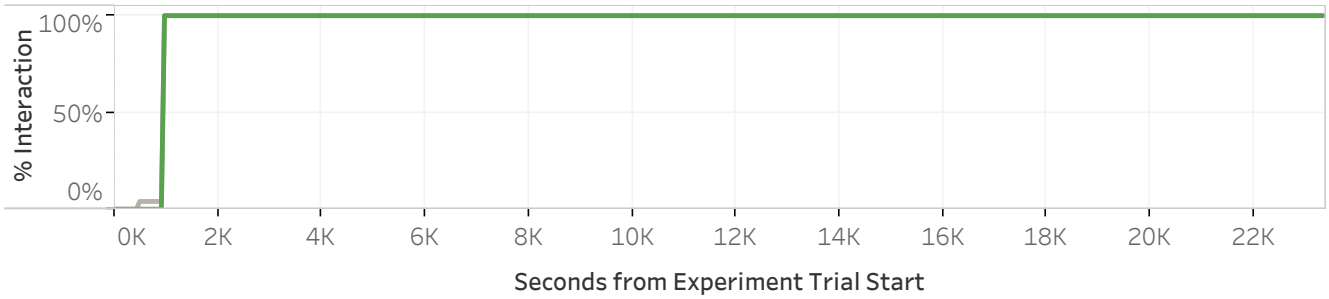
Real & Decoy Packets per Minute

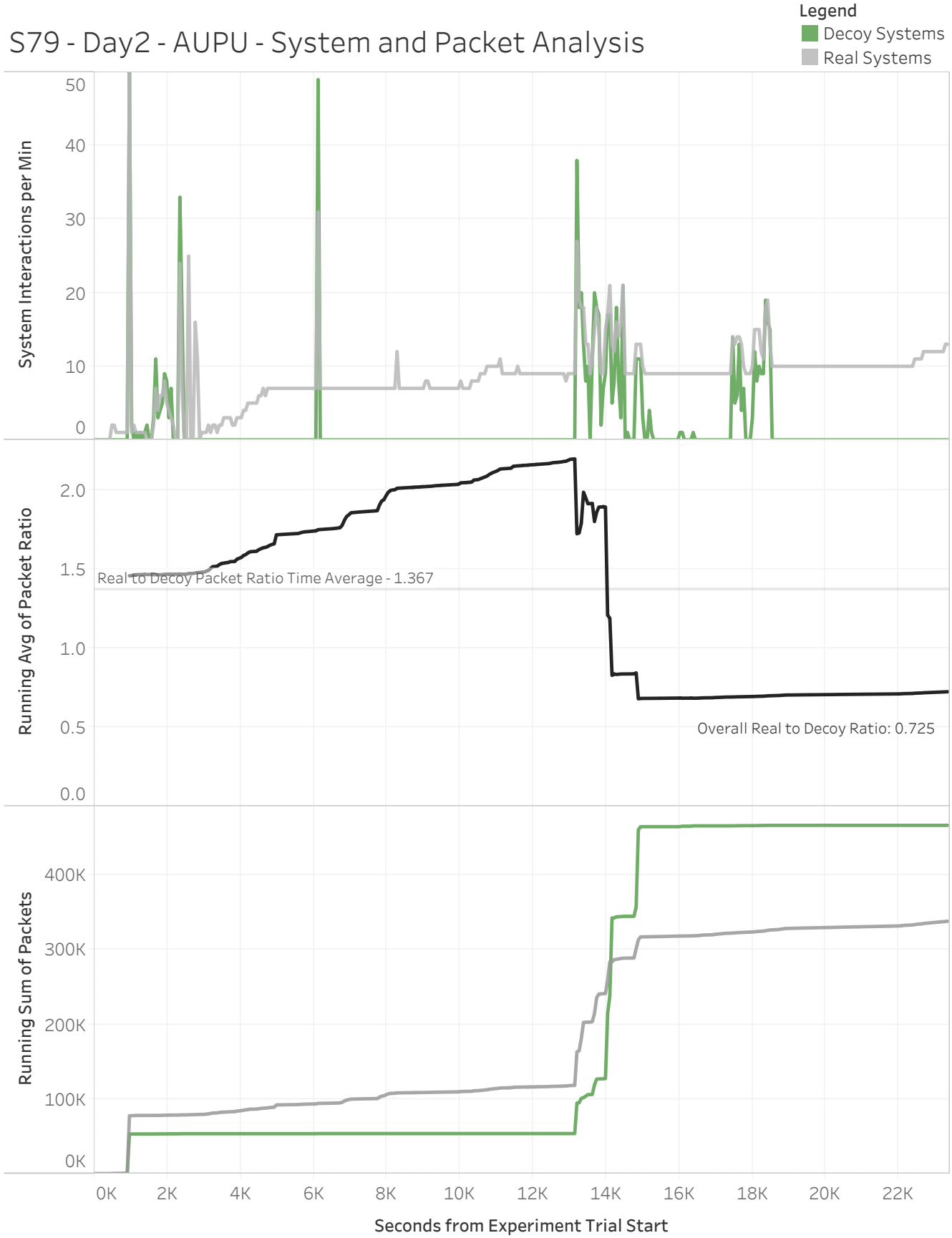


Real to Decoy Packet Ratio



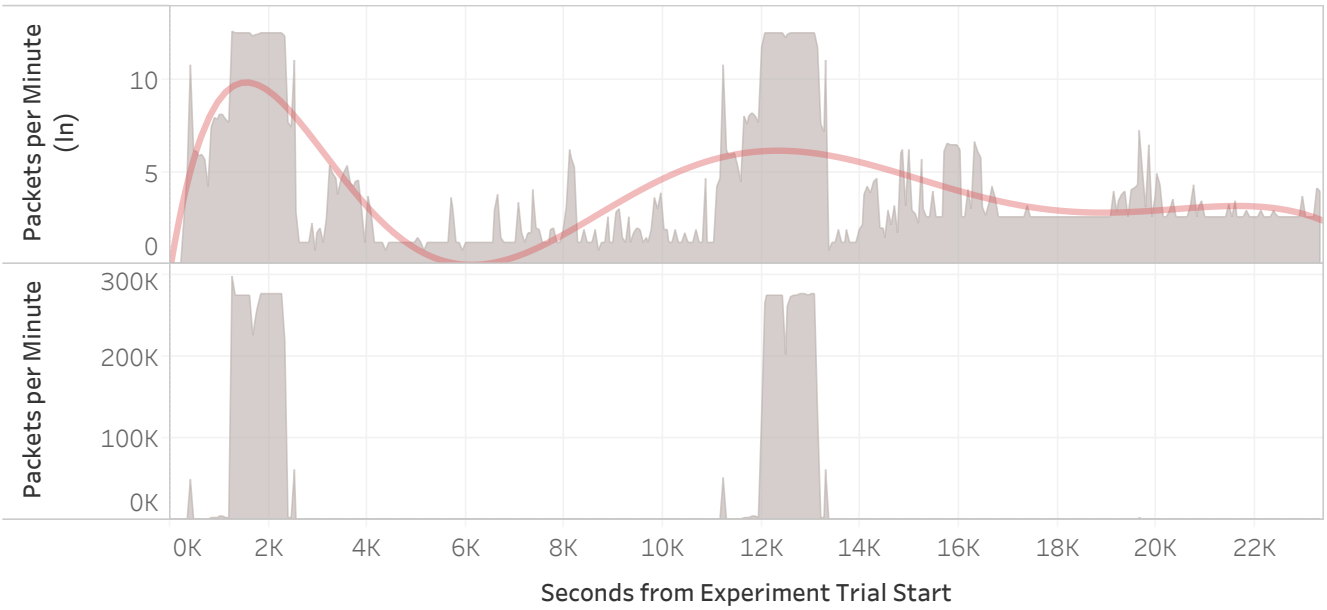
Real & Decoy System Interaction Timeline



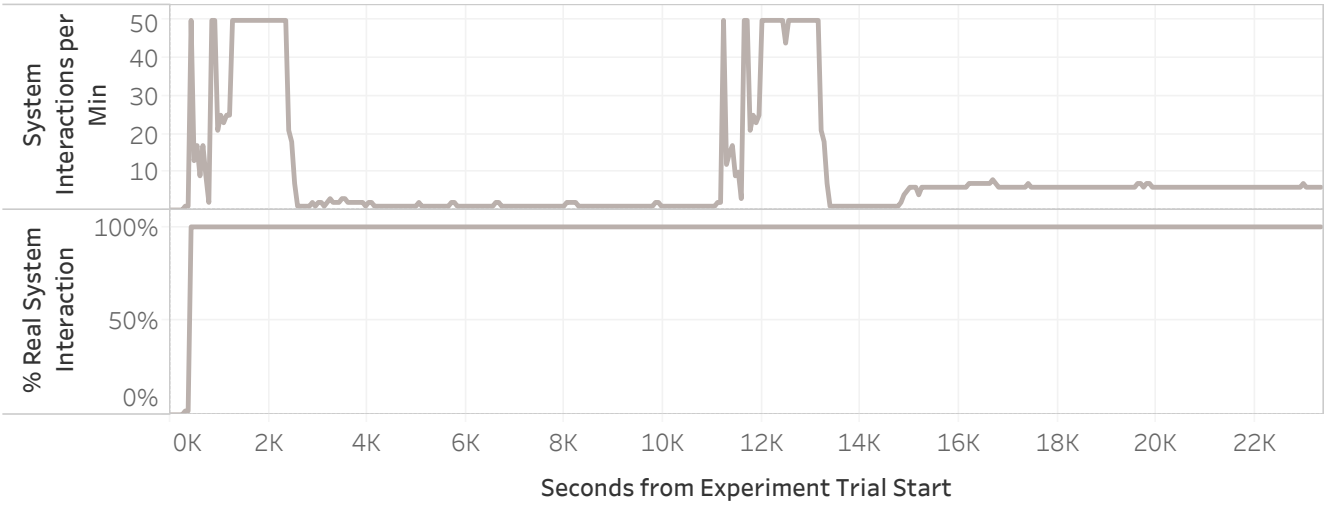

S79 - Day2 - AUPU - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
2.0
1.5
1.0
0.5
0.0
Real to Decoy Packet Ratio Time Average - 1.367
Overall Real to Decoy Ratio: 0.725
Running Sum of Packets
400K
300K
200K
100K
0K
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

S81 - Day 2 - PUAU

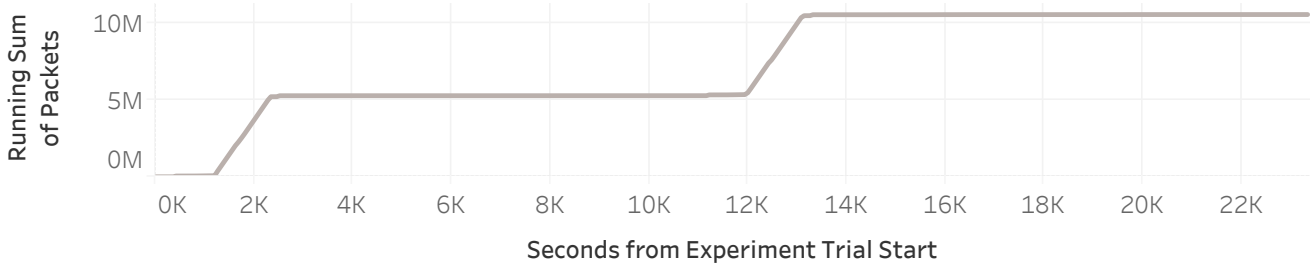
Real Packets per Minute



Real System Interaction Timeline

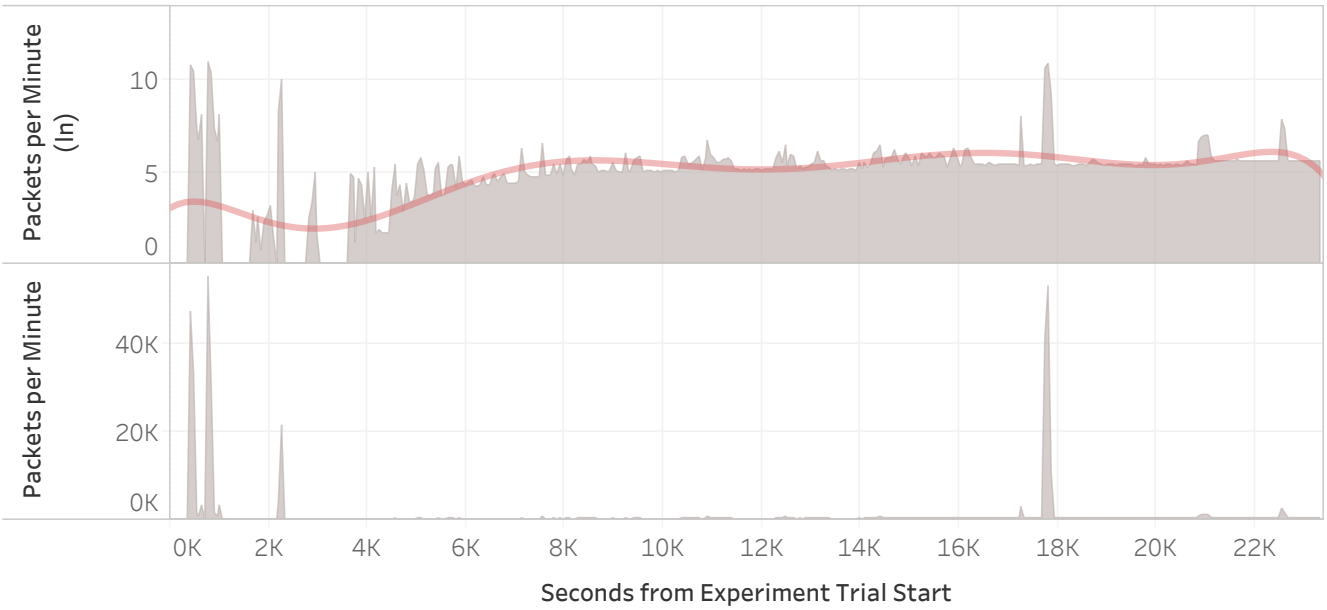


Running Sum of Packets

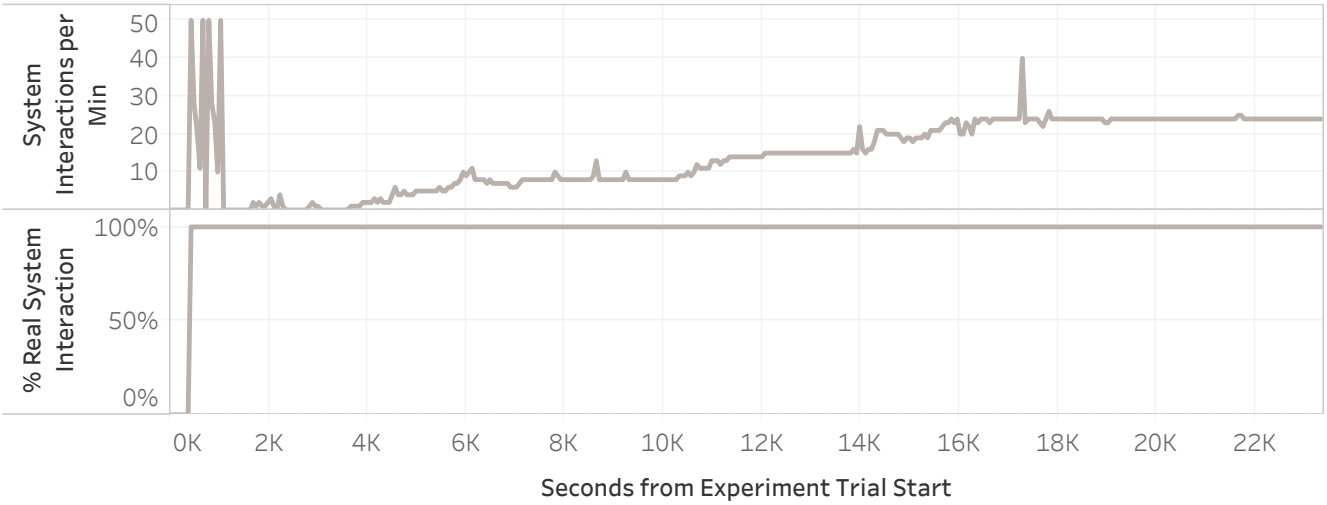


S82 - Day 2 - PUAU

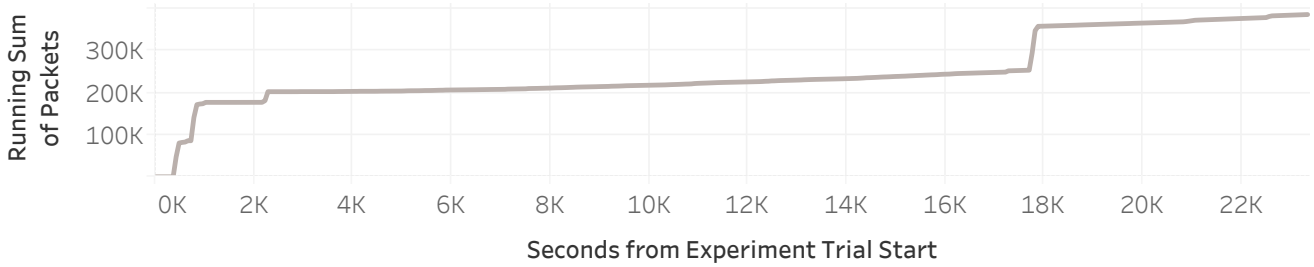
Real Packets per Minute



Real System Interaction Timeline

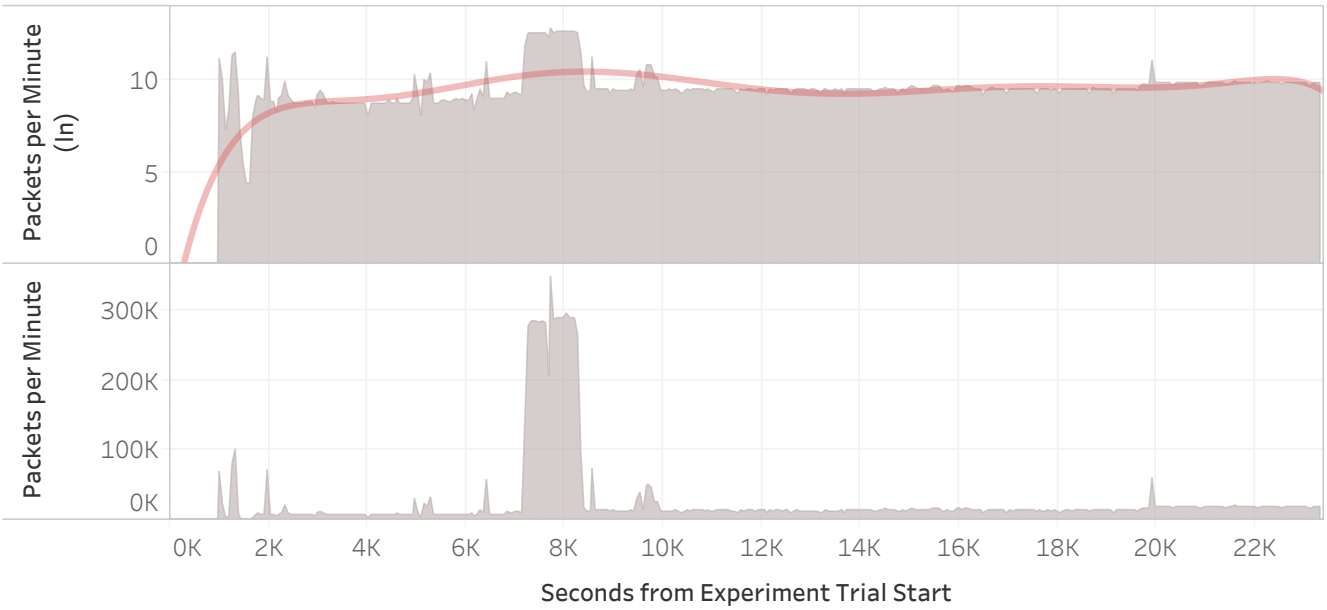


Running Sum of Packets

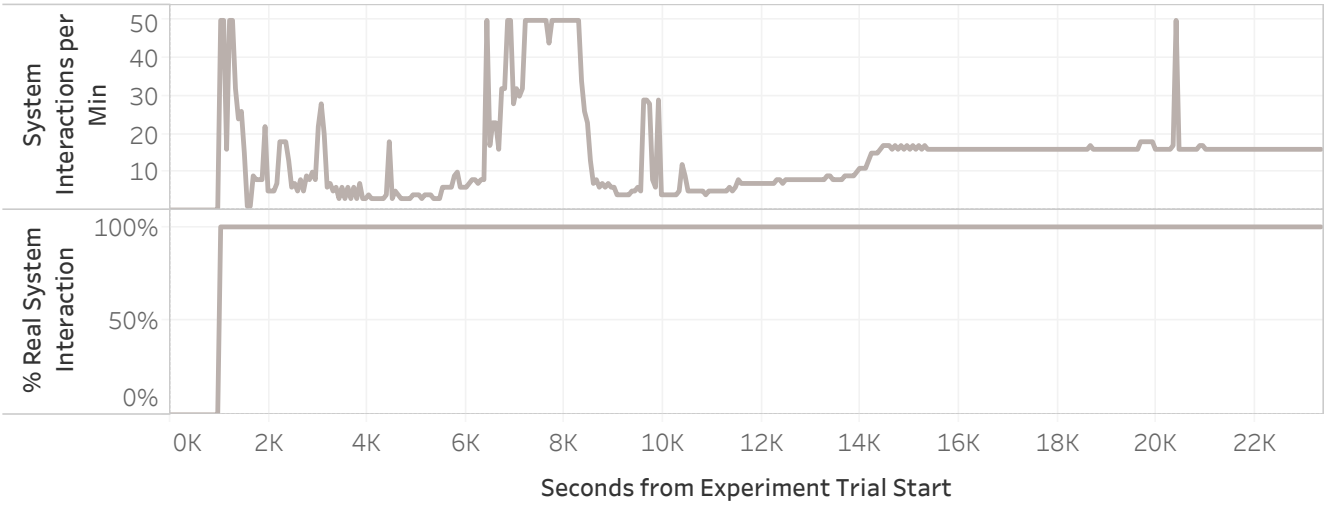


S83 - Day 2 - PUAU

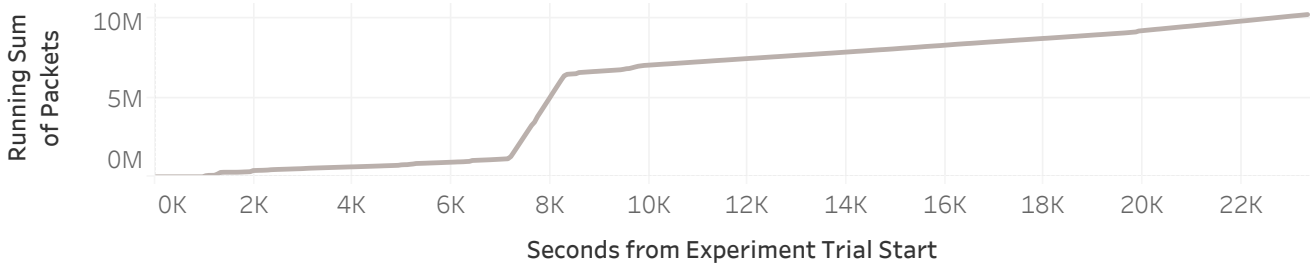
Real Packets per Minute



Real System Interaction Timeline

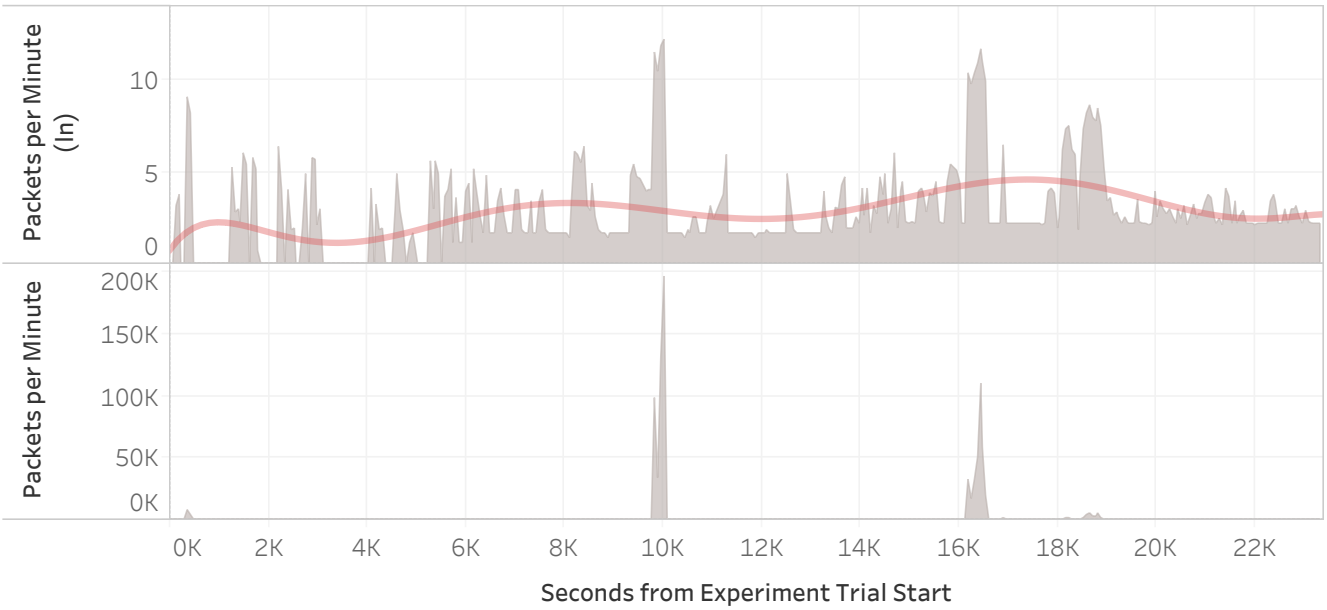


Running Sum of Packets

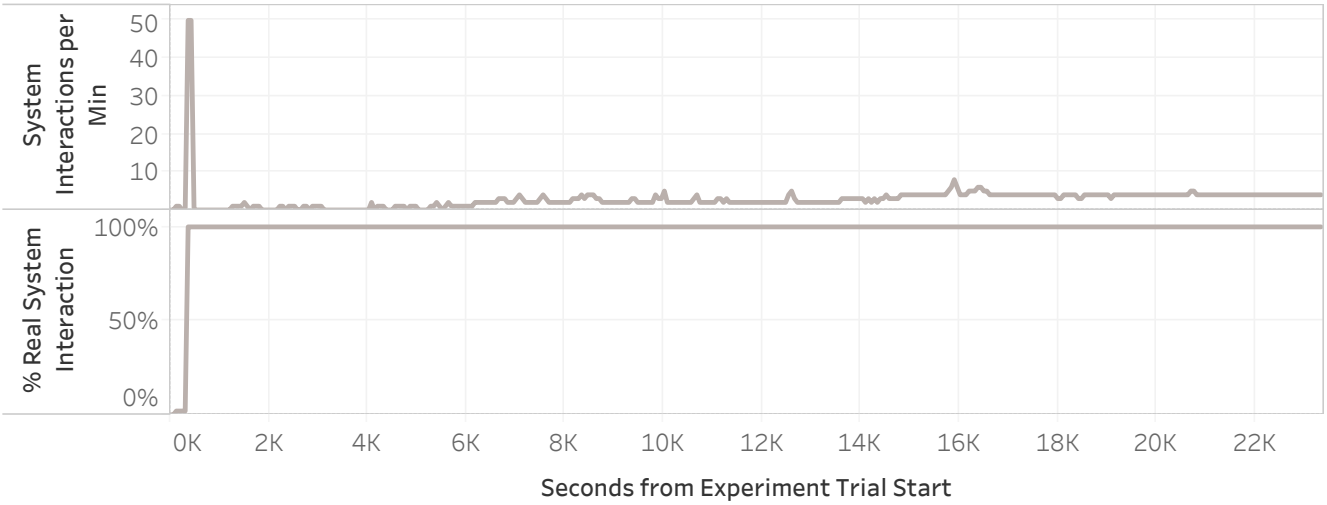


S84 - Day 2 - PUAU

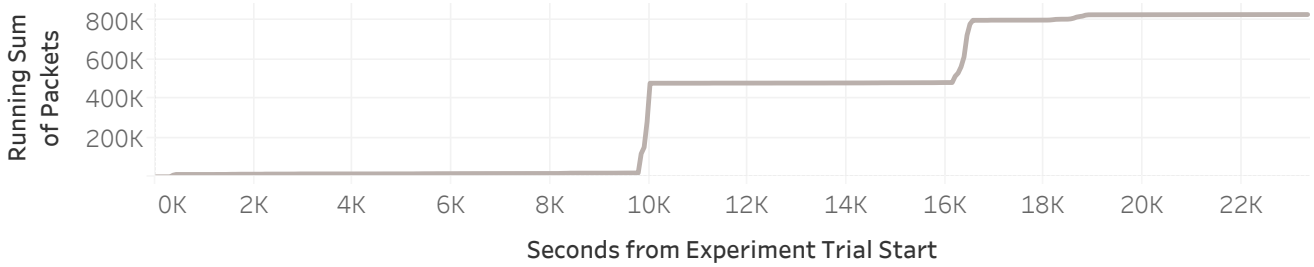
Real Packets per Minute



Real System Interaction Timeline

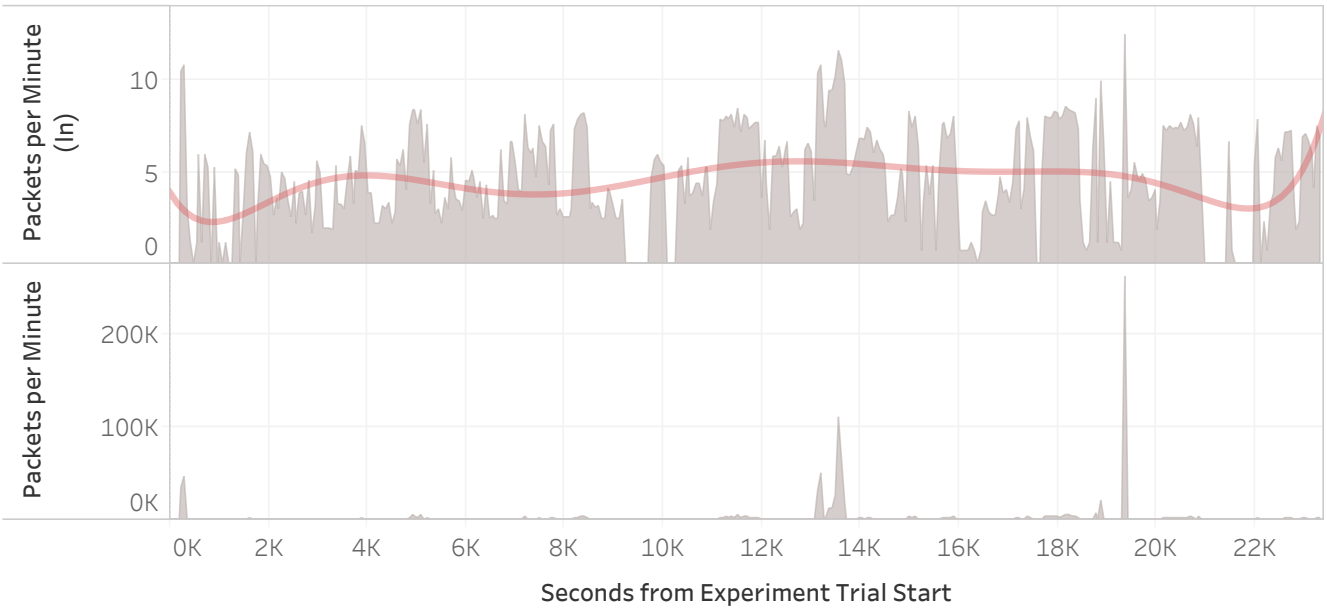


Running Sum of Packets

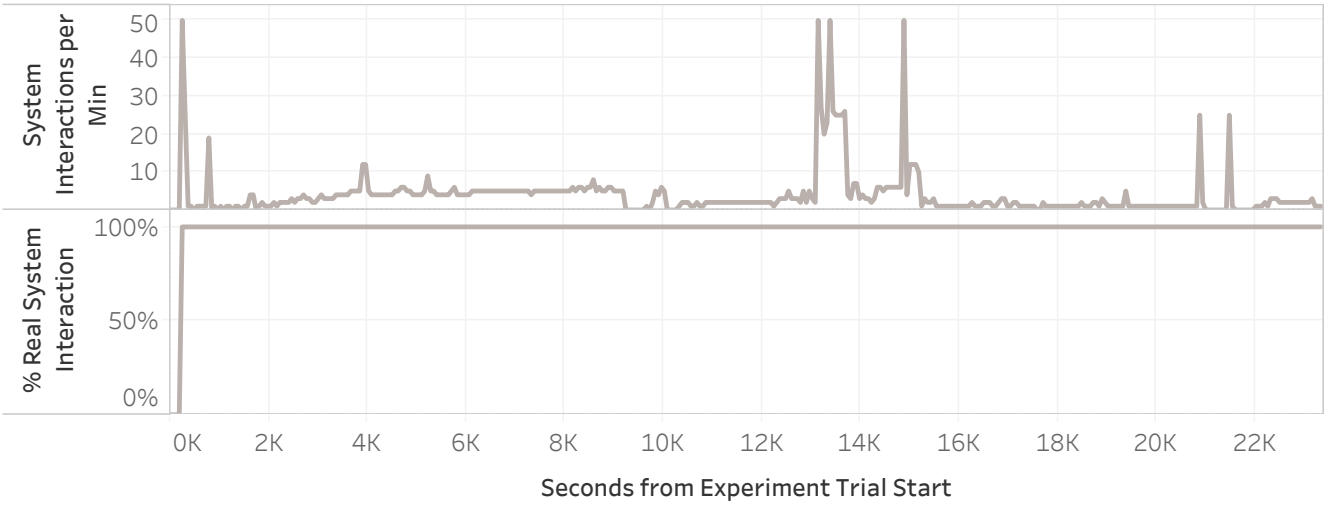


S85 - Day 2 - PUAU

Real Packets per Minute



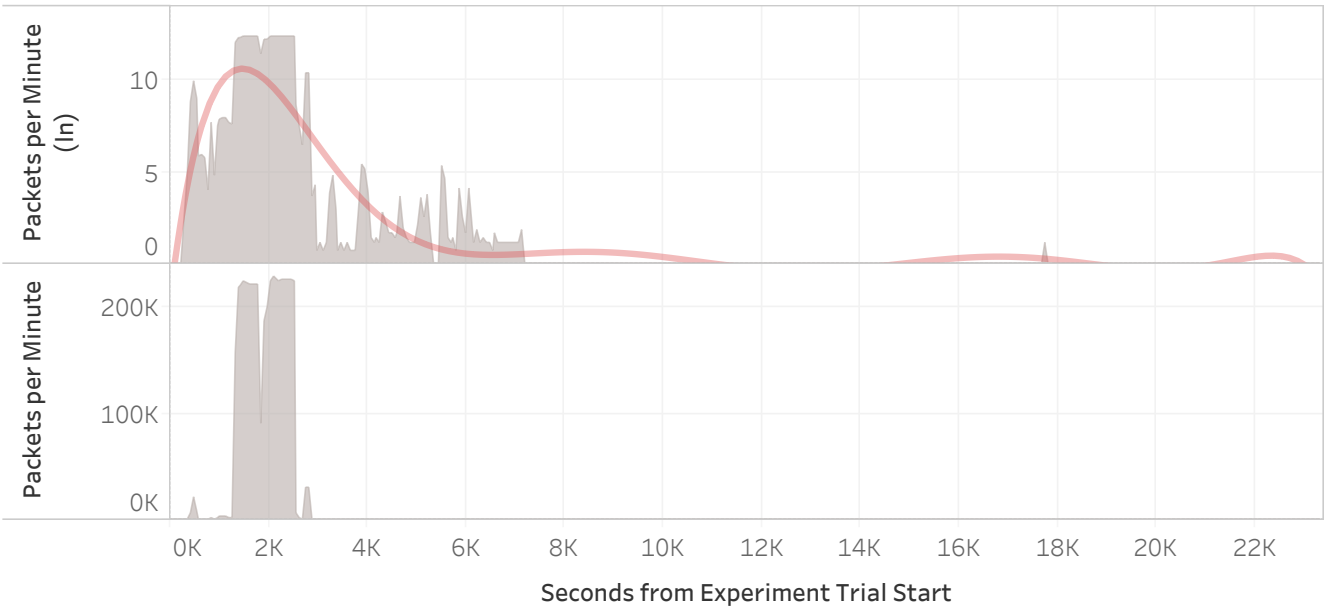
Real System Interaction Timeline



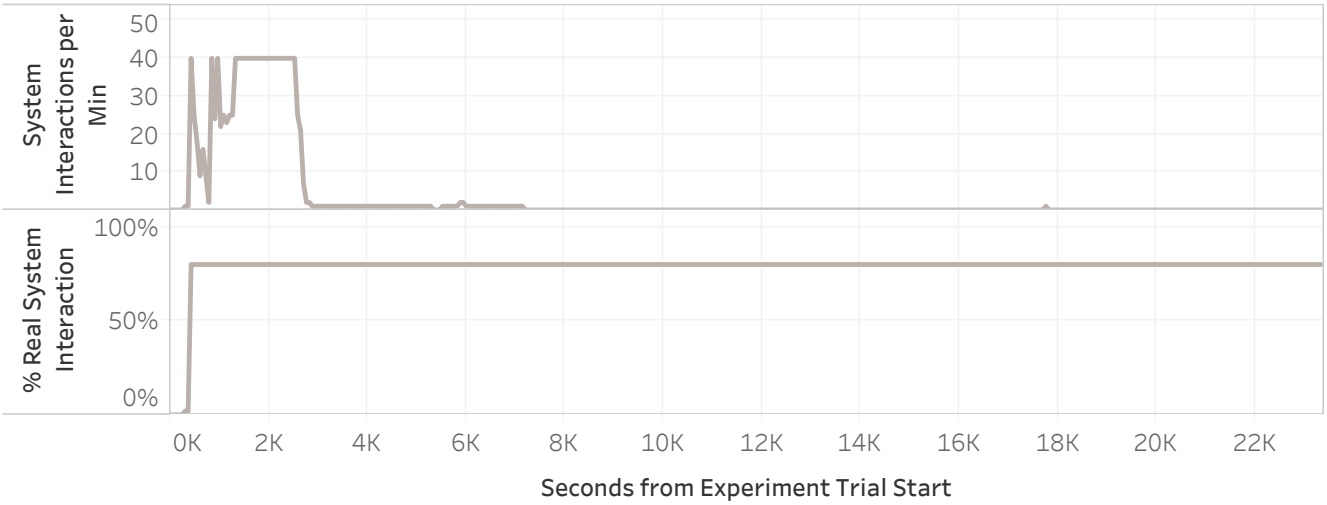
Running Sum of Packets

S86 - Day 2 - PUAU

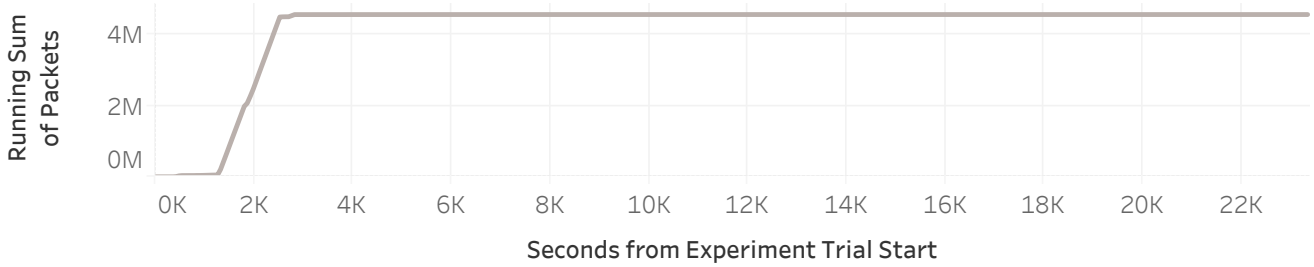
Real Packets per Minute



Real System Interaction Timeline

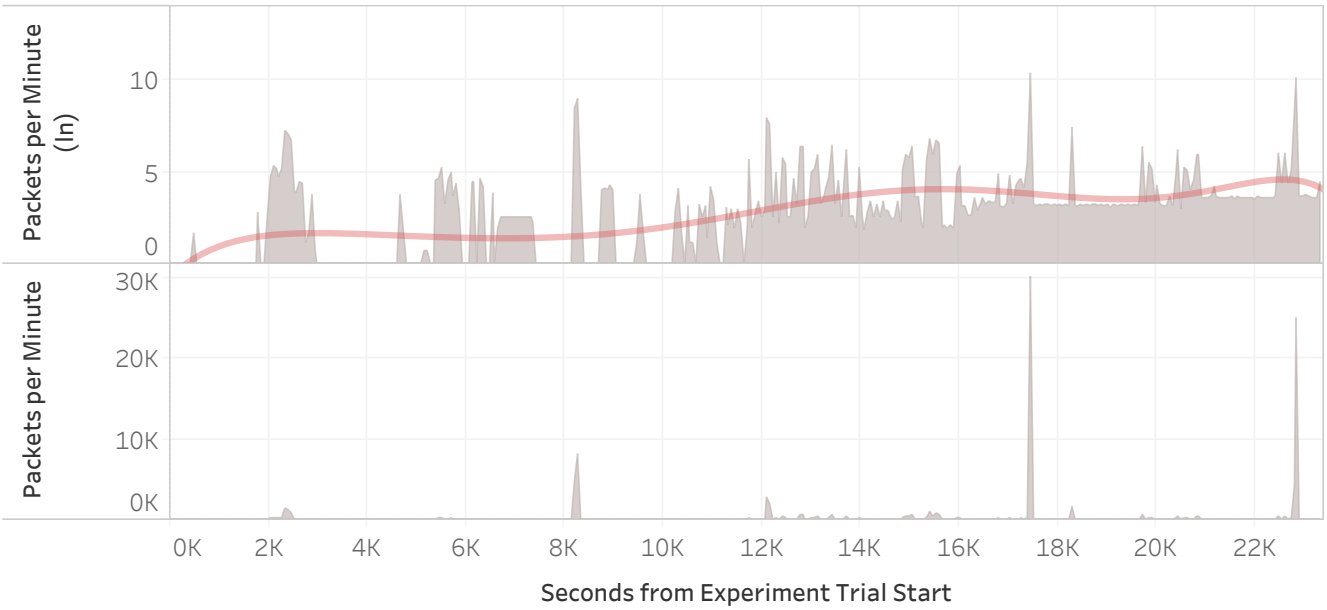


Running Sum of Packets

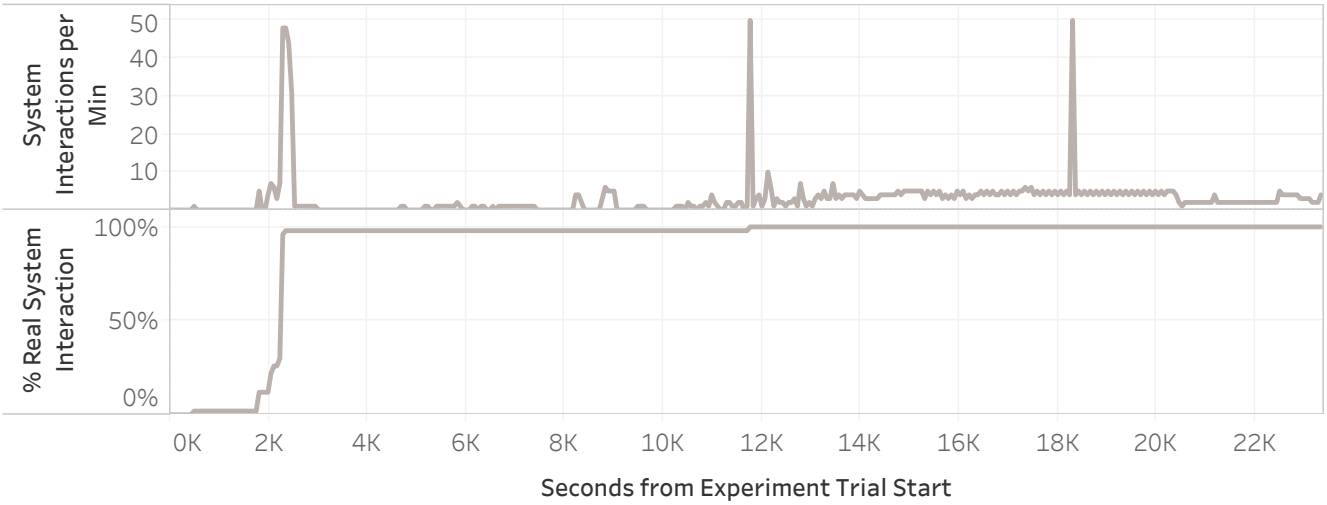


S87 - Day 2 - PUAU

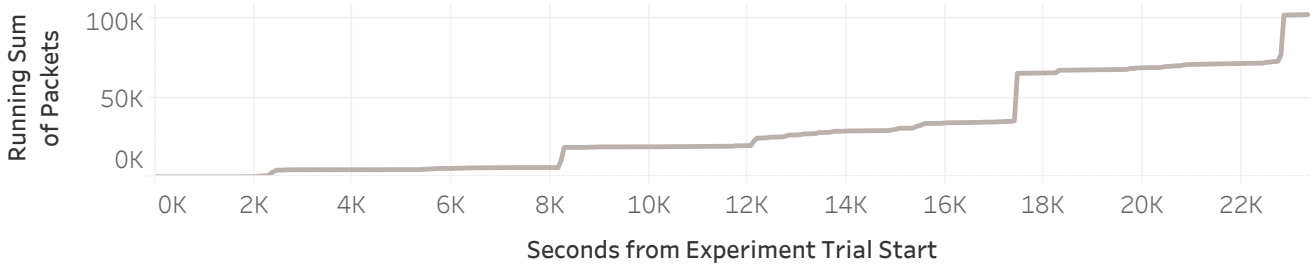
Real Packets per Minute



Real System Interaction Timeline

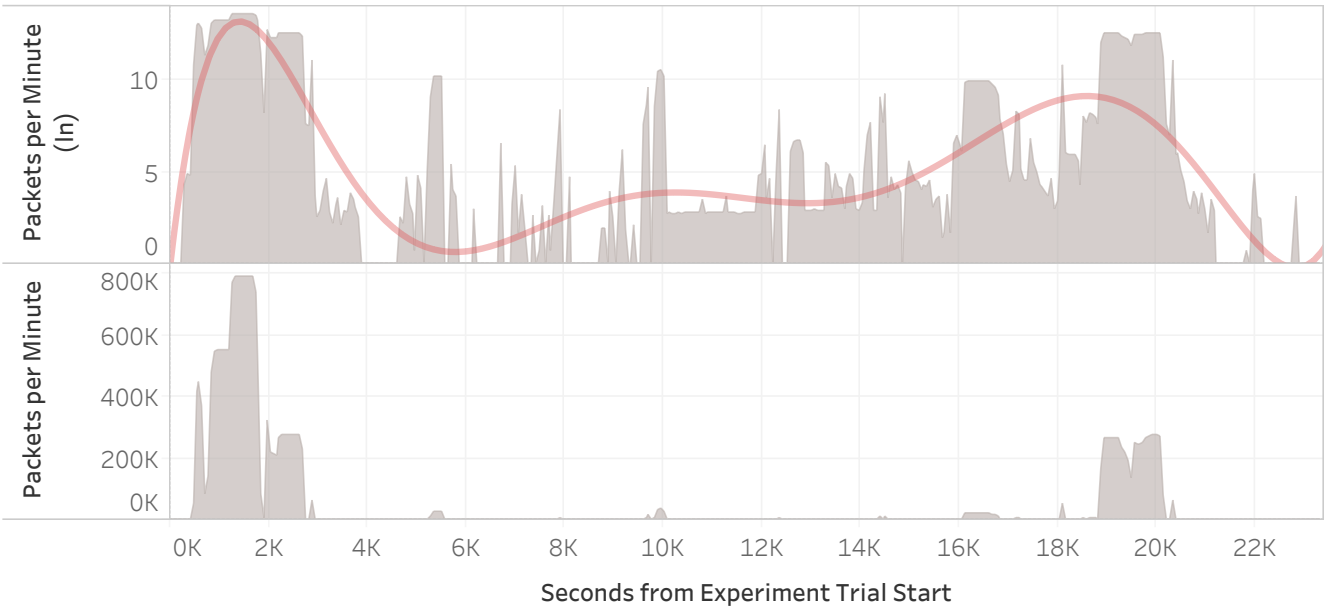


Running Sum of Packets

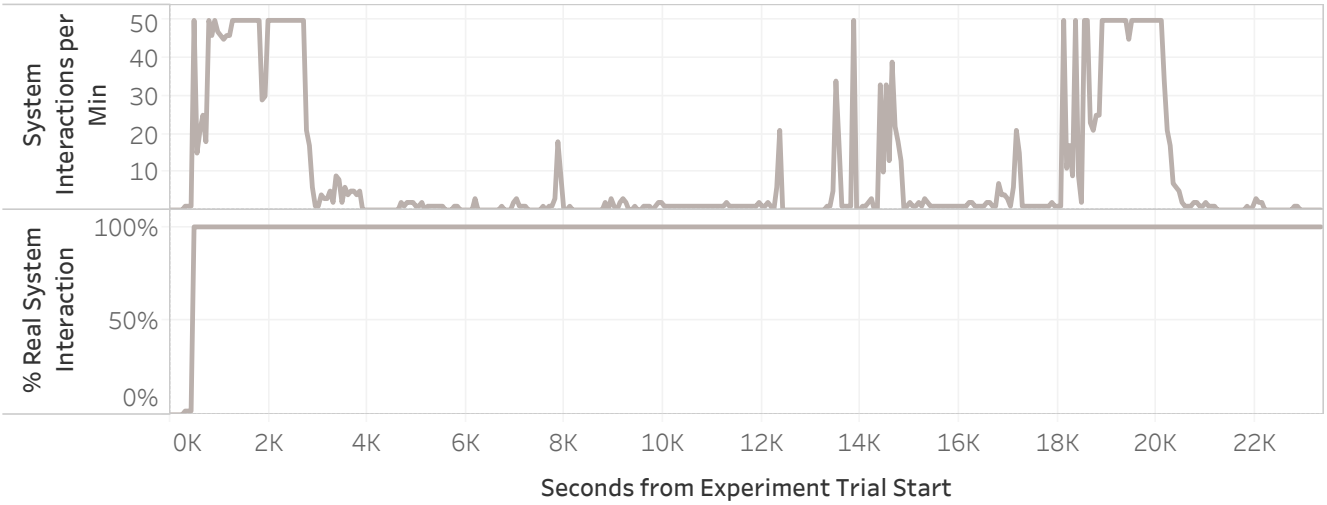


S89 - Day 2 - PUAU

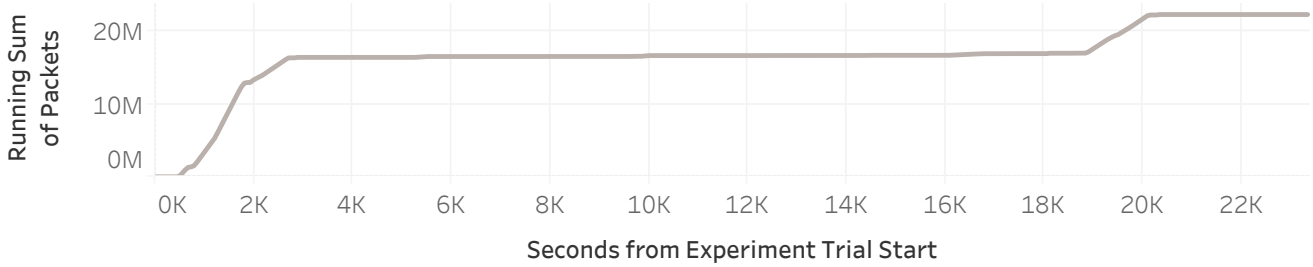
Real Packets per Minute



Real System Interaction Timeline

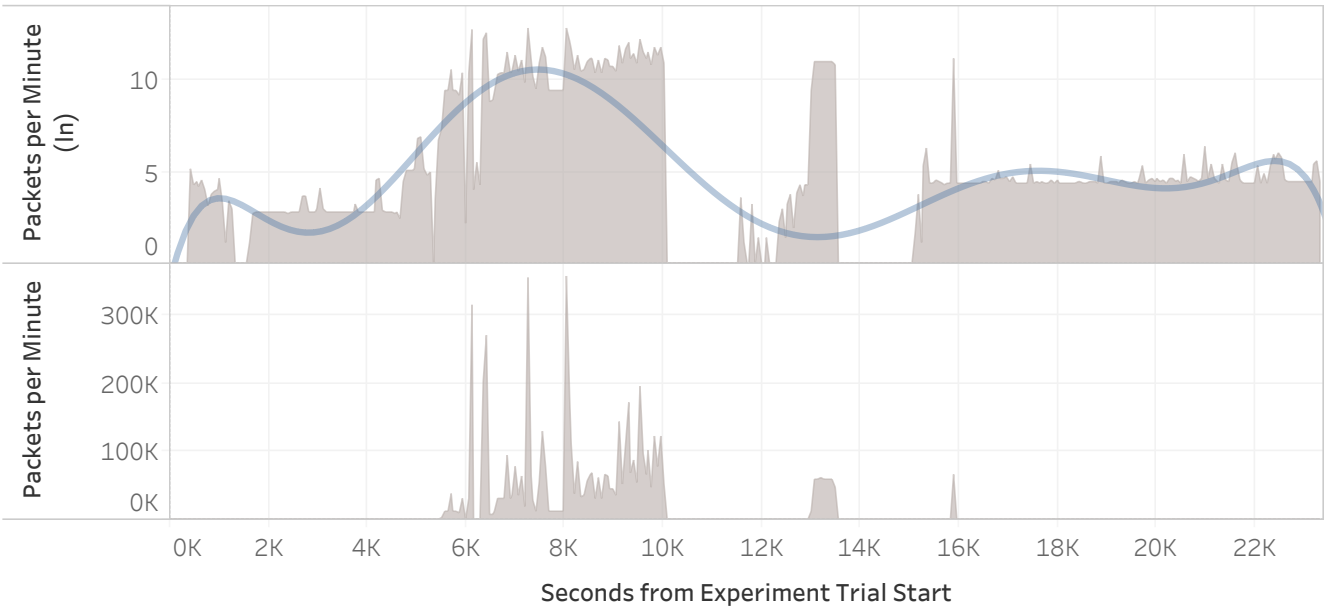


Running Sum of Packets

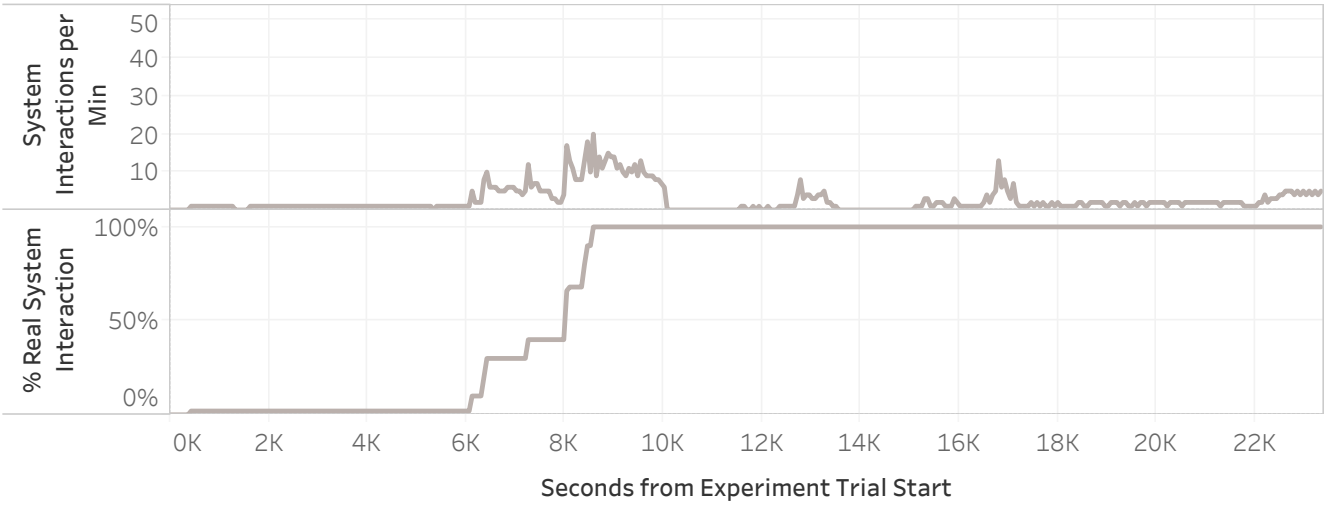


S90 - Day 2 - AIAU

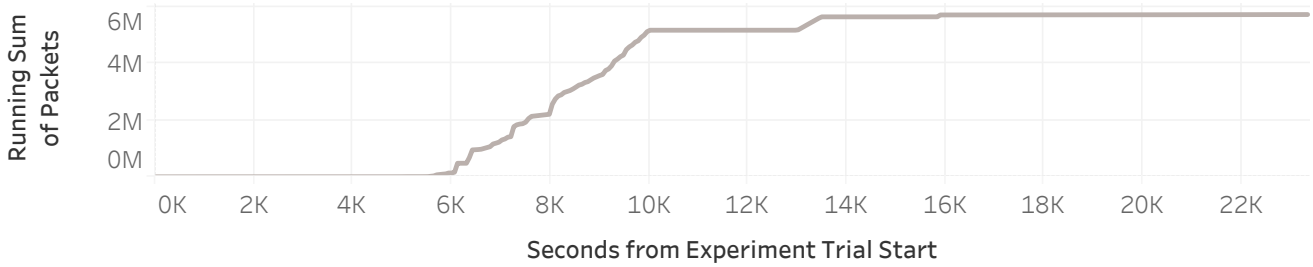
Real Packets per Minute



Real System Interaction Timeline

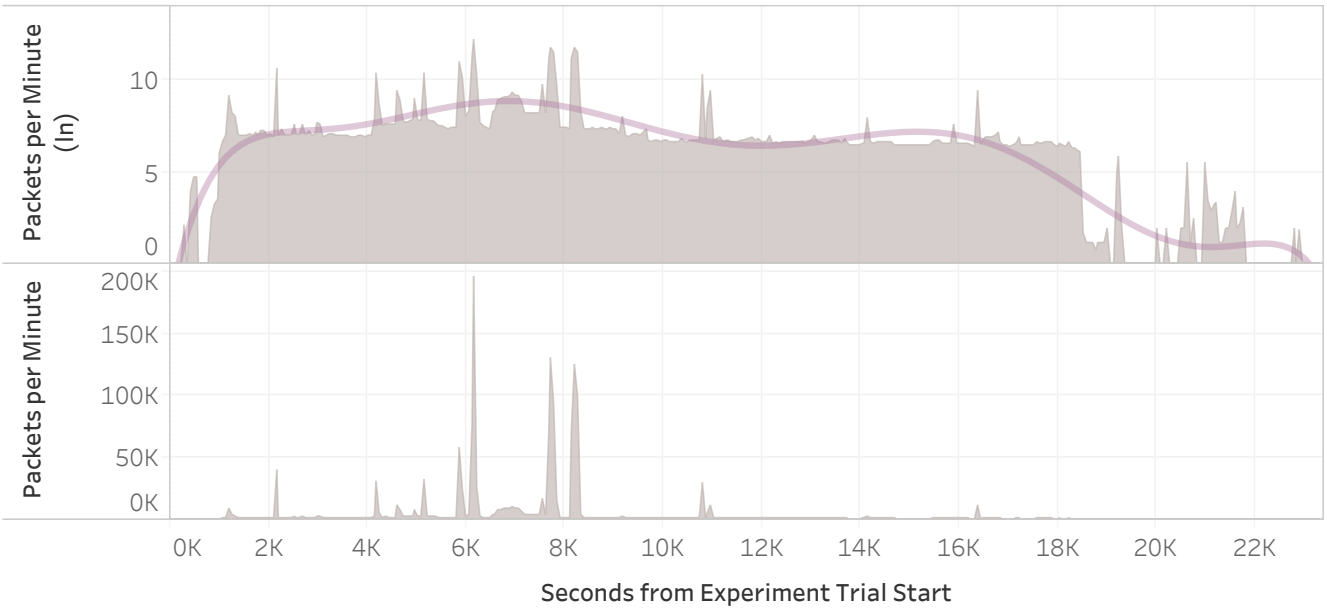


Running Sum of Packets

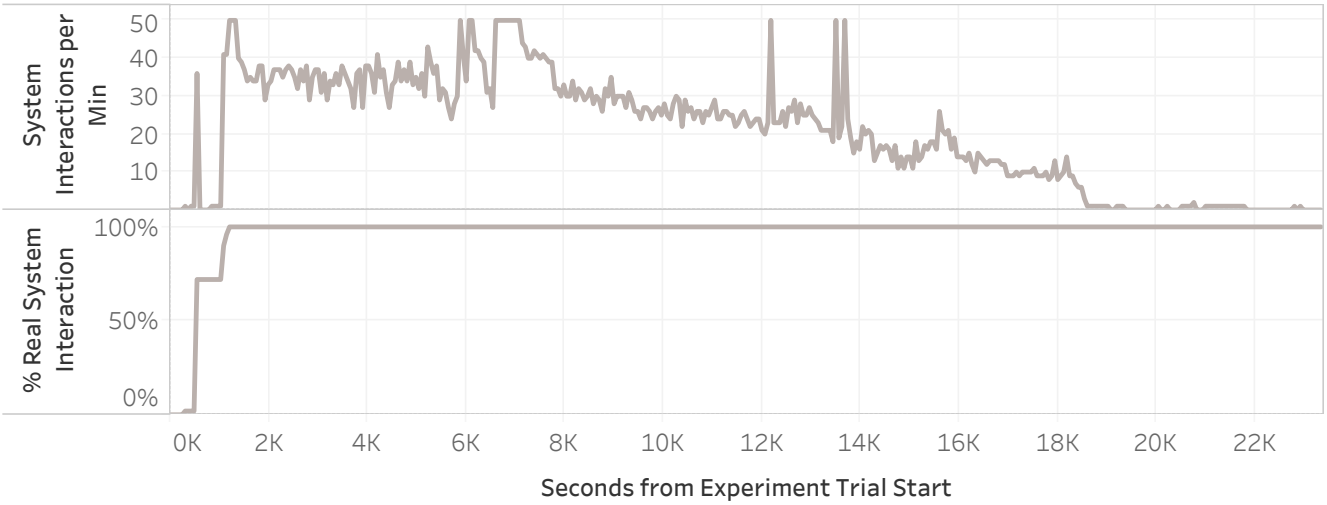


S91 - Day 2 - PIAU

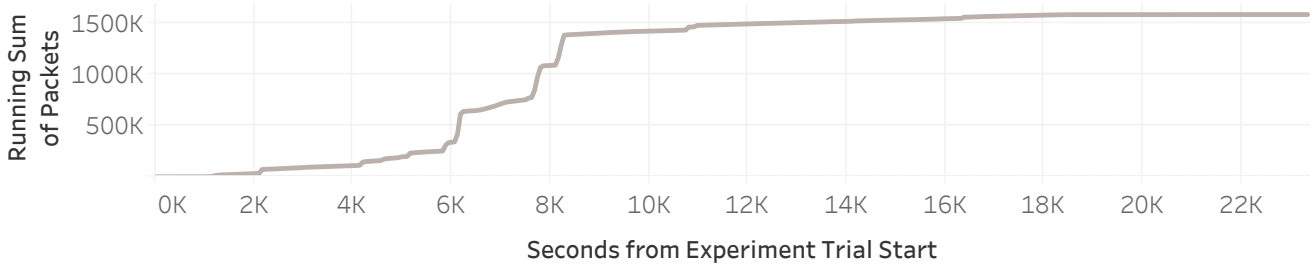
Real Packets per Minute



Real System Interaction Timeline

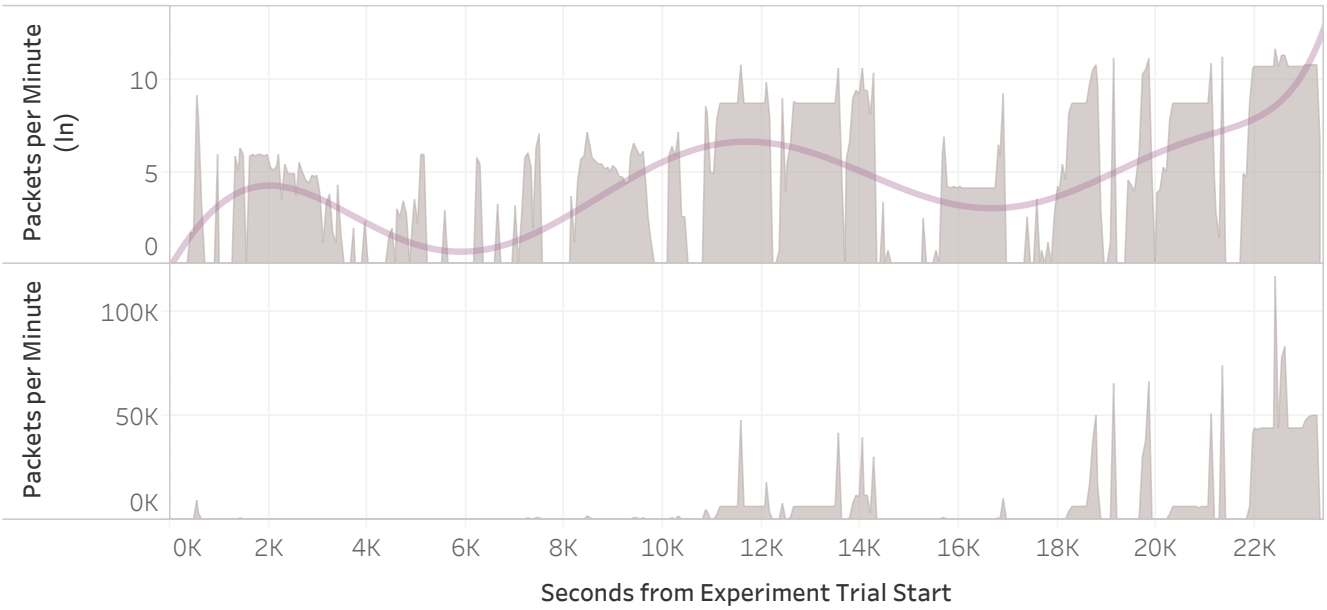


Running Sum of Packets

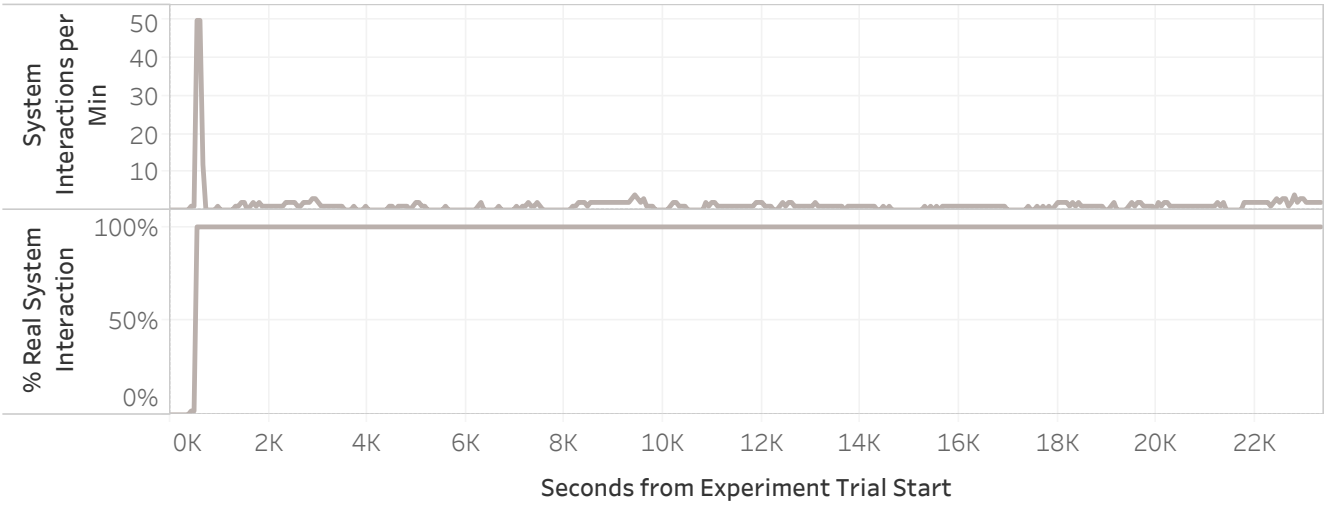


S92 - Day 2 - PIAU

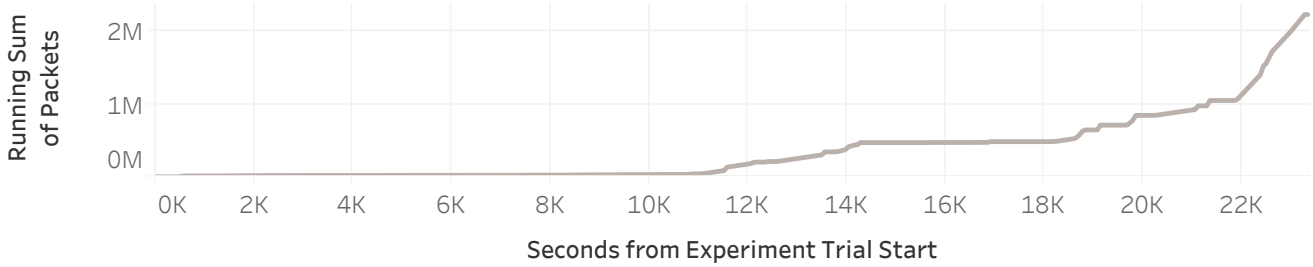
Real Packets per Minute



Real System Interaction Timeline

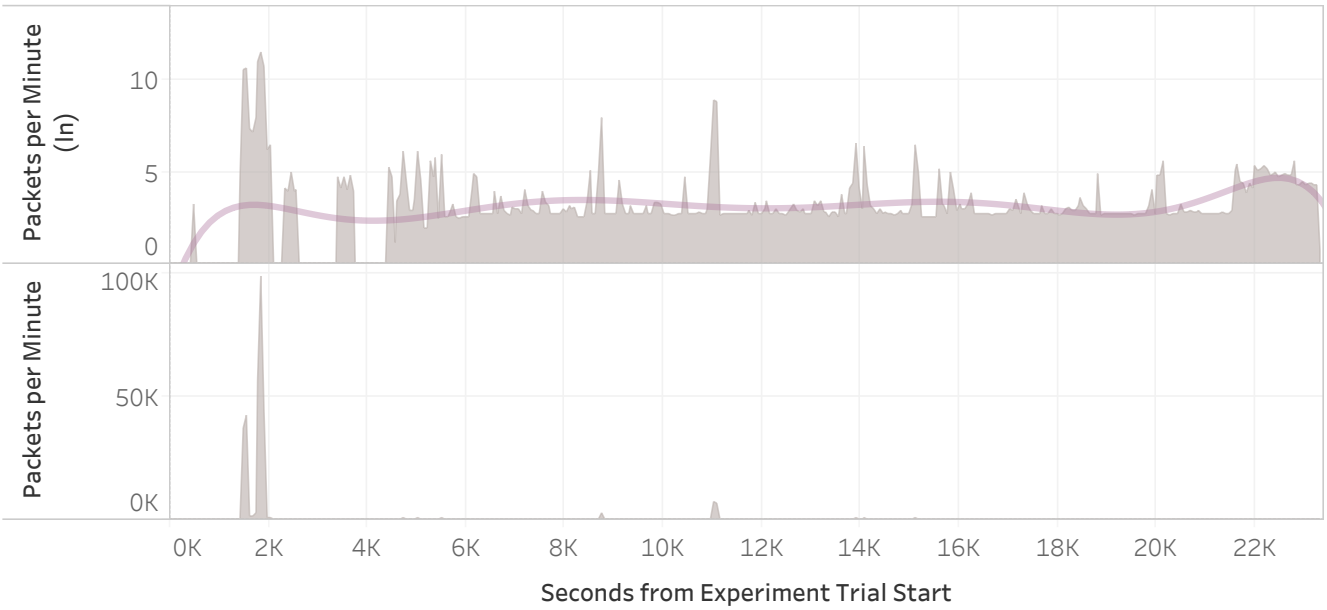


Running Sum of Packets

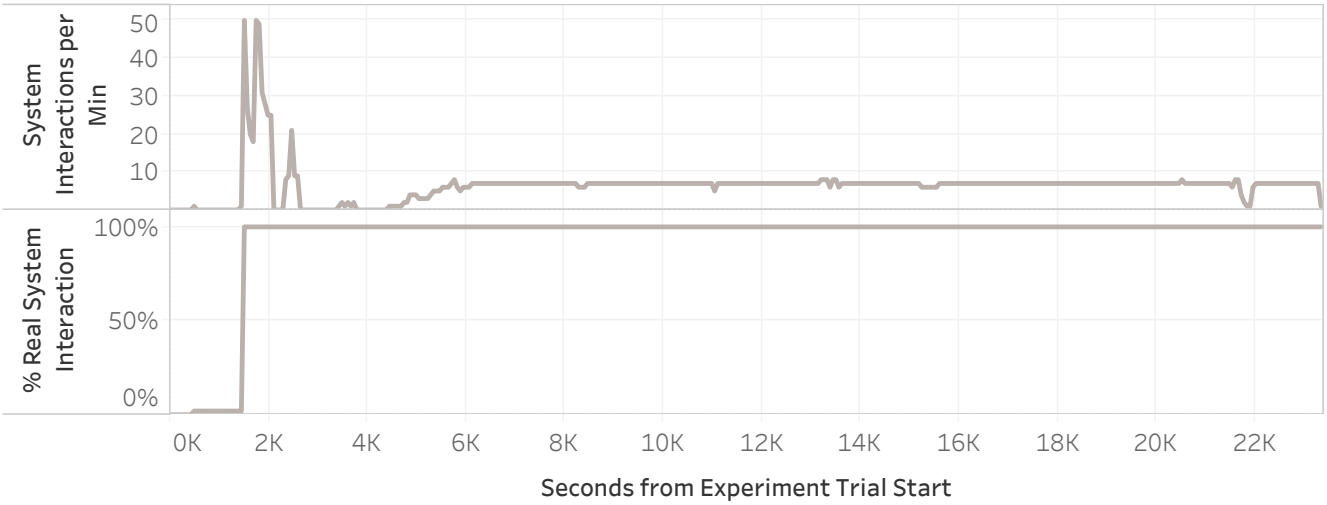


S93 - Day 2 - PIAU

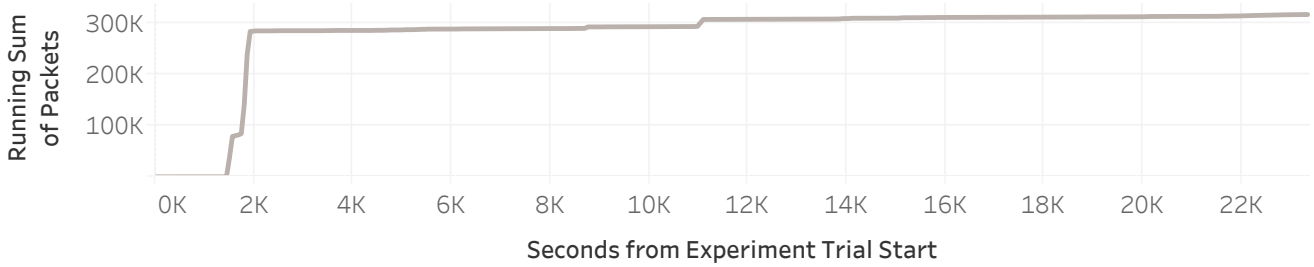
Real Packets per Minute



Real System Interaction Timeline

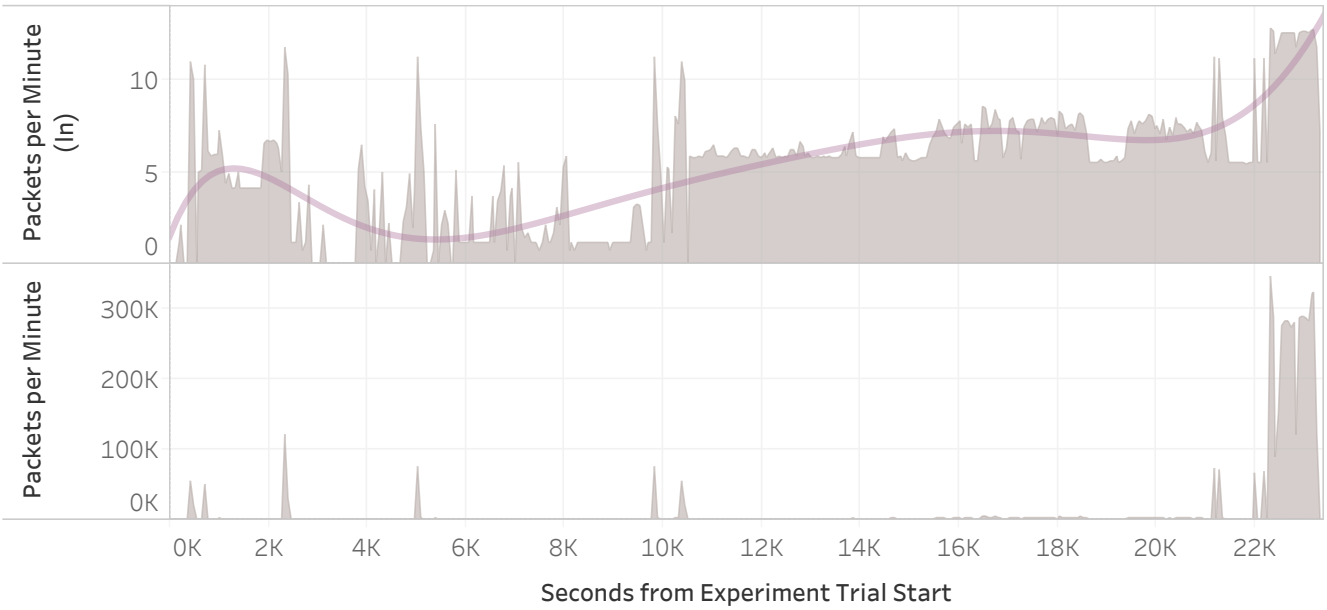


Running Sum of Packets

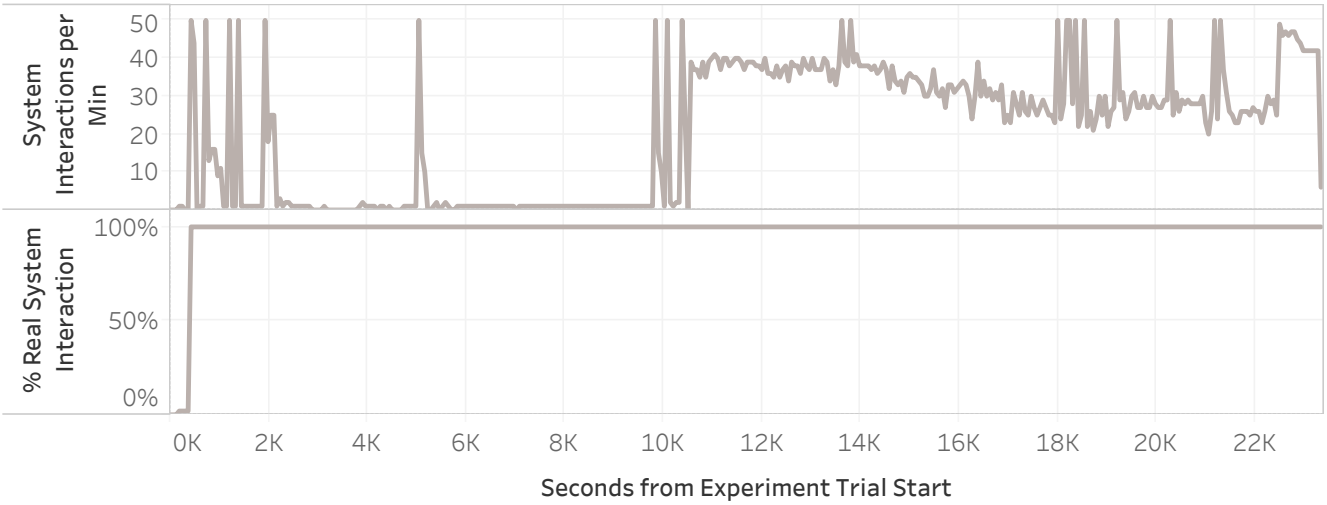


S94 - Day 2 - PIAU

Real Packets per Minute



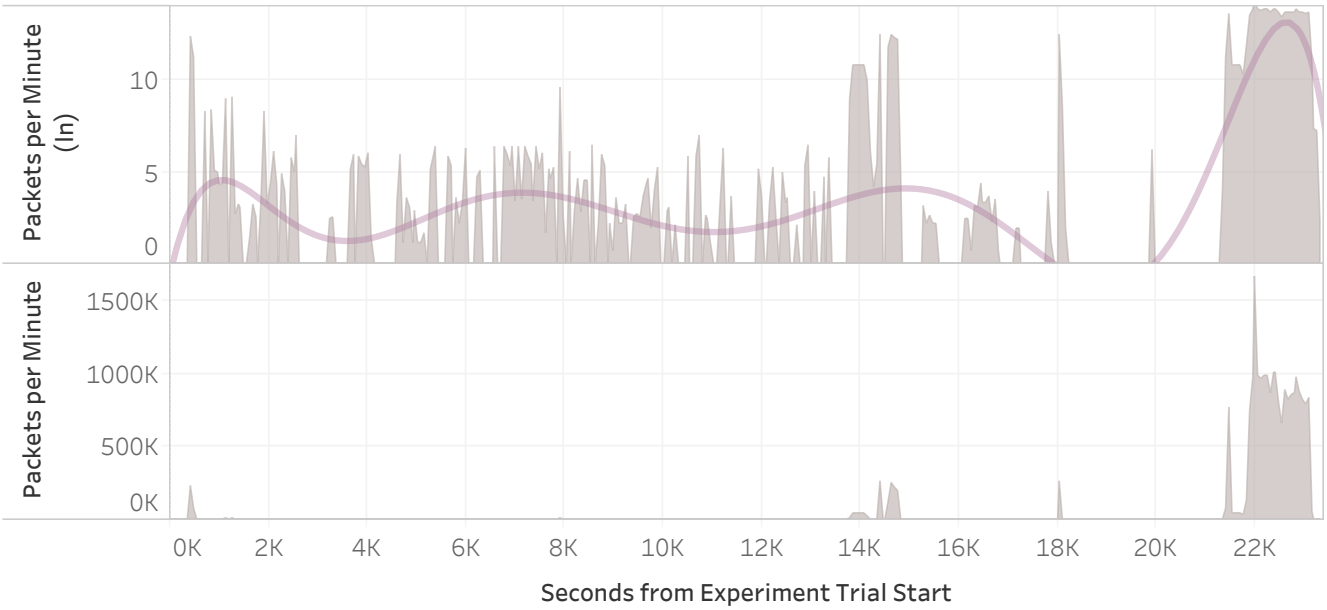
Real System Interaction Timeline



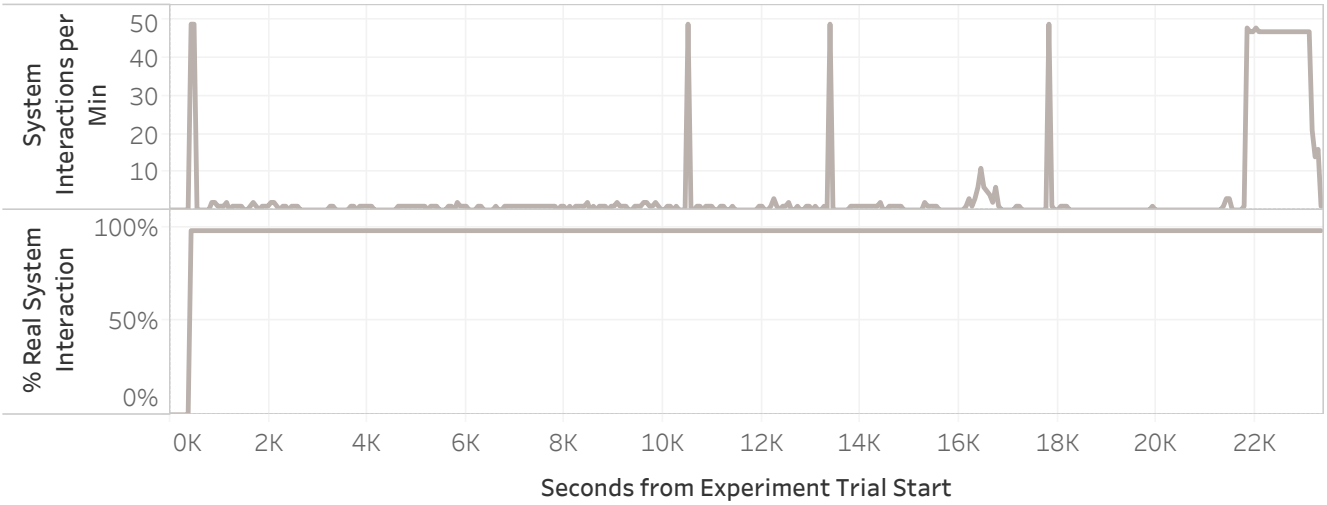
Running Sum of Packets

S95 - Day 2 - PIAU

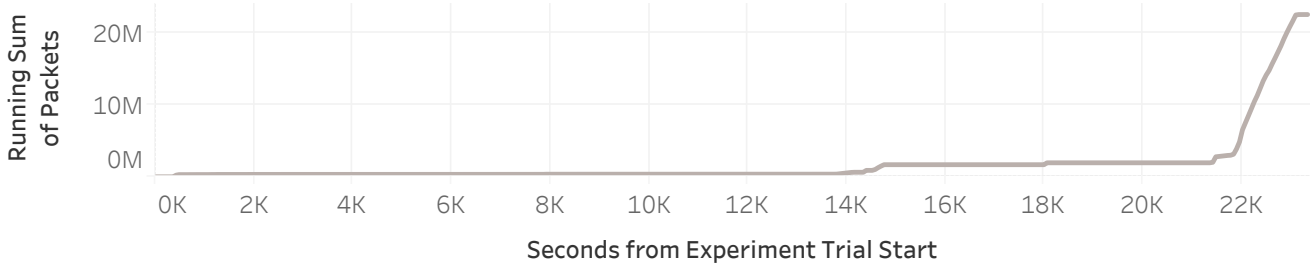
Real Packets per Minute



Real System Interaction Timeline

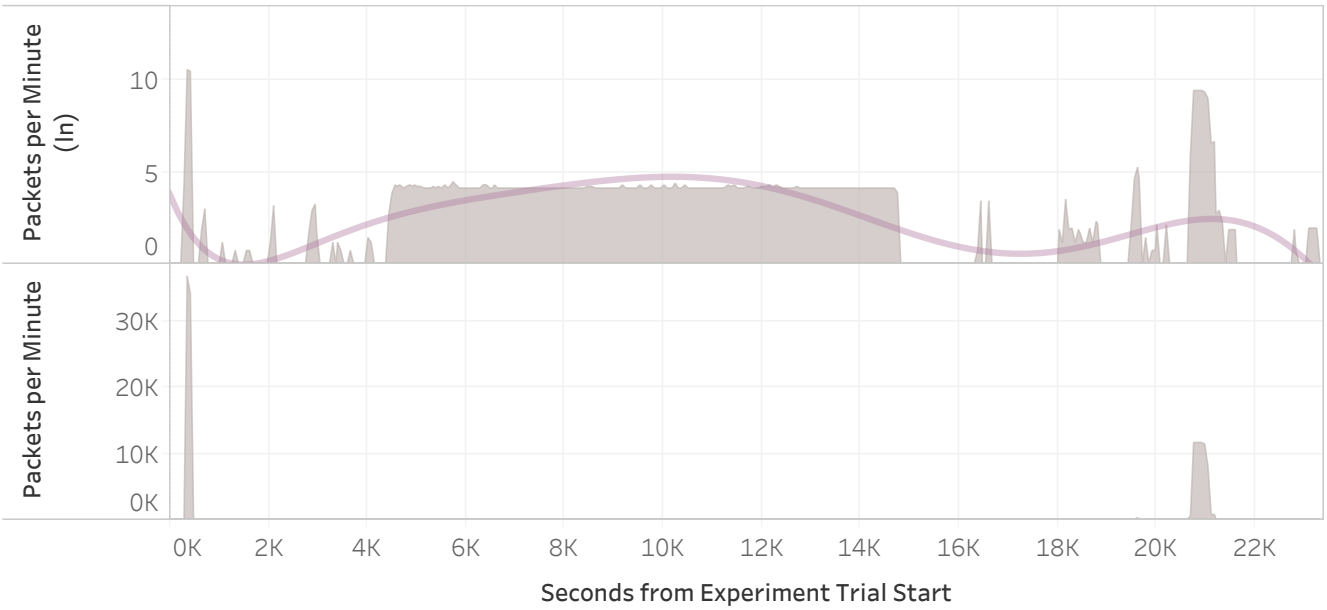


Running Sum of Packets

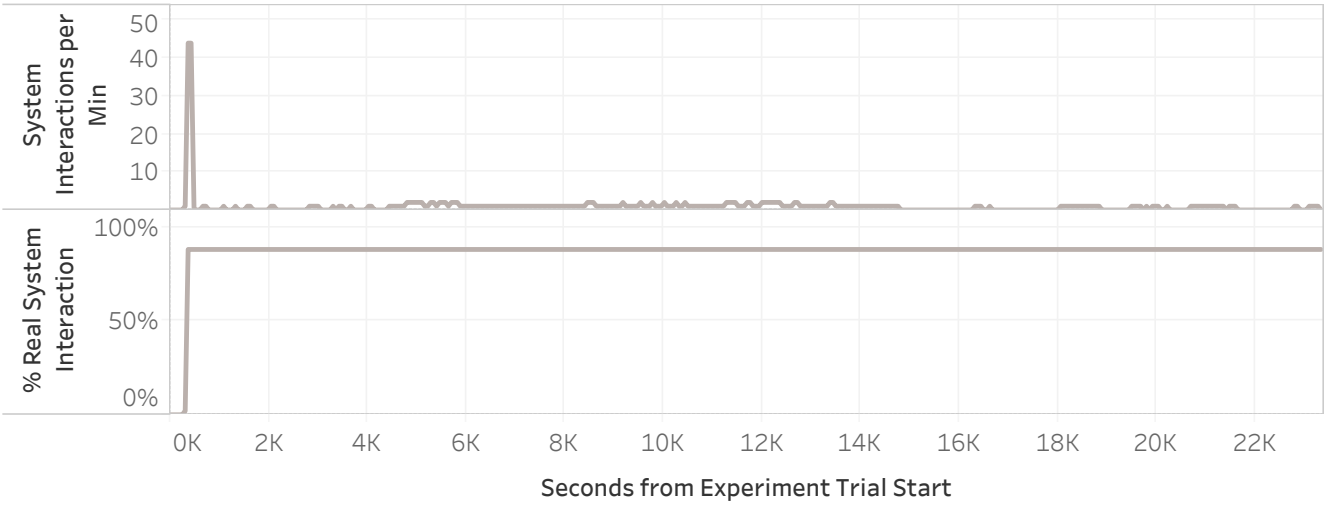


S96 - Day 2 - PIAU

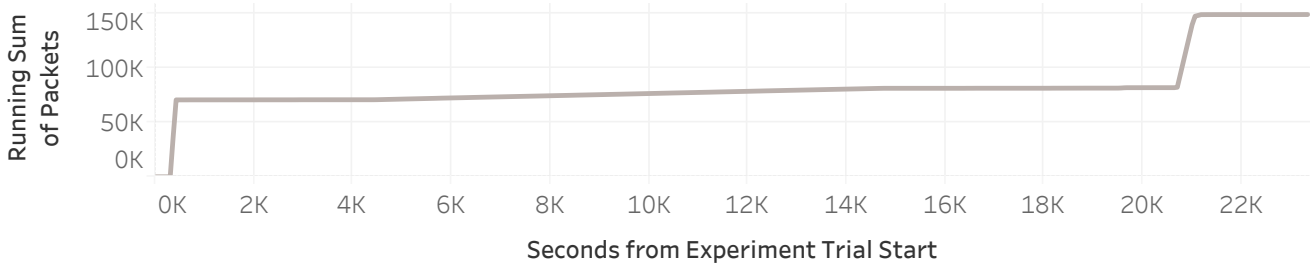
Real Packets per Minute



Real System Interaction Timeline

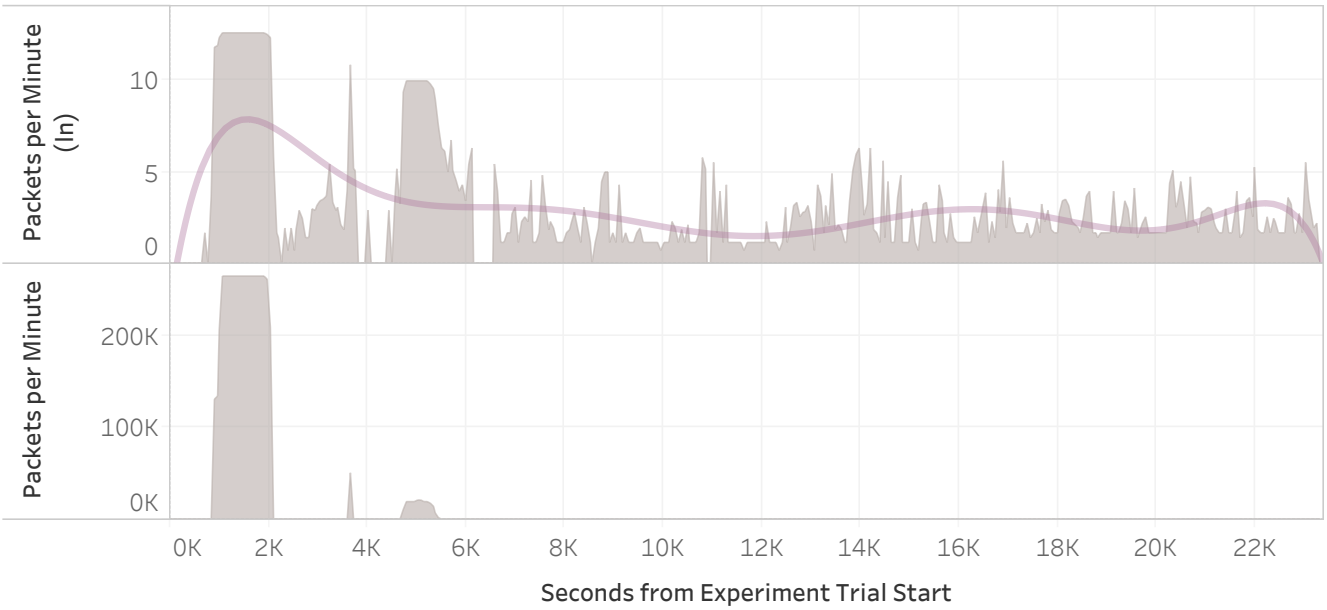


Running Sum of Packets

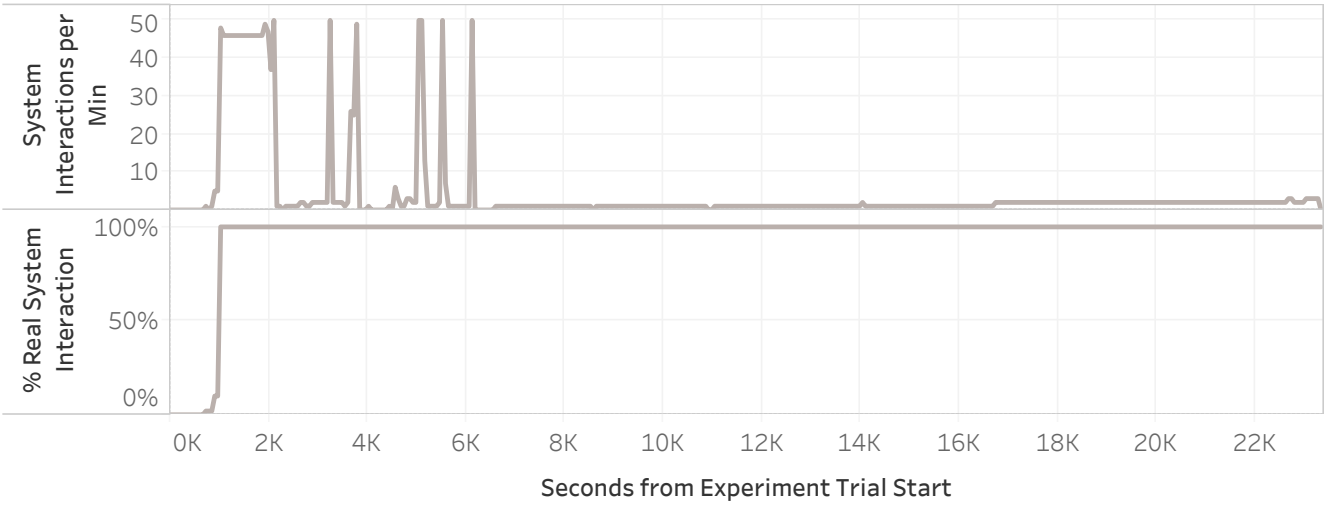


S97 - Day 2 - PIAU

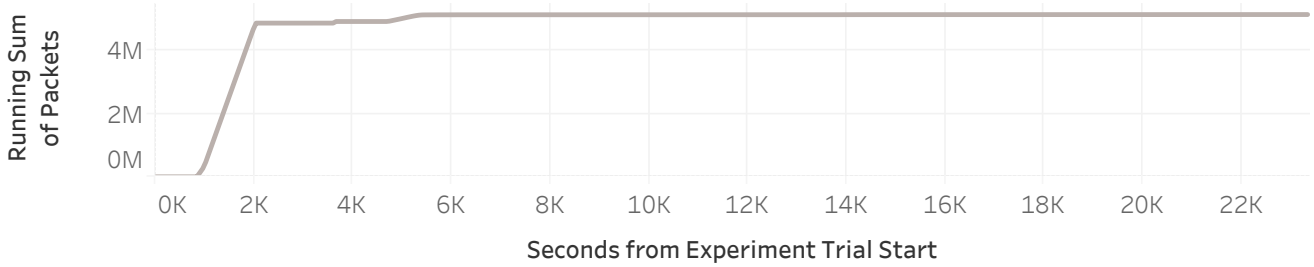
Real Packets per Minute



Real System Interaction Timeline

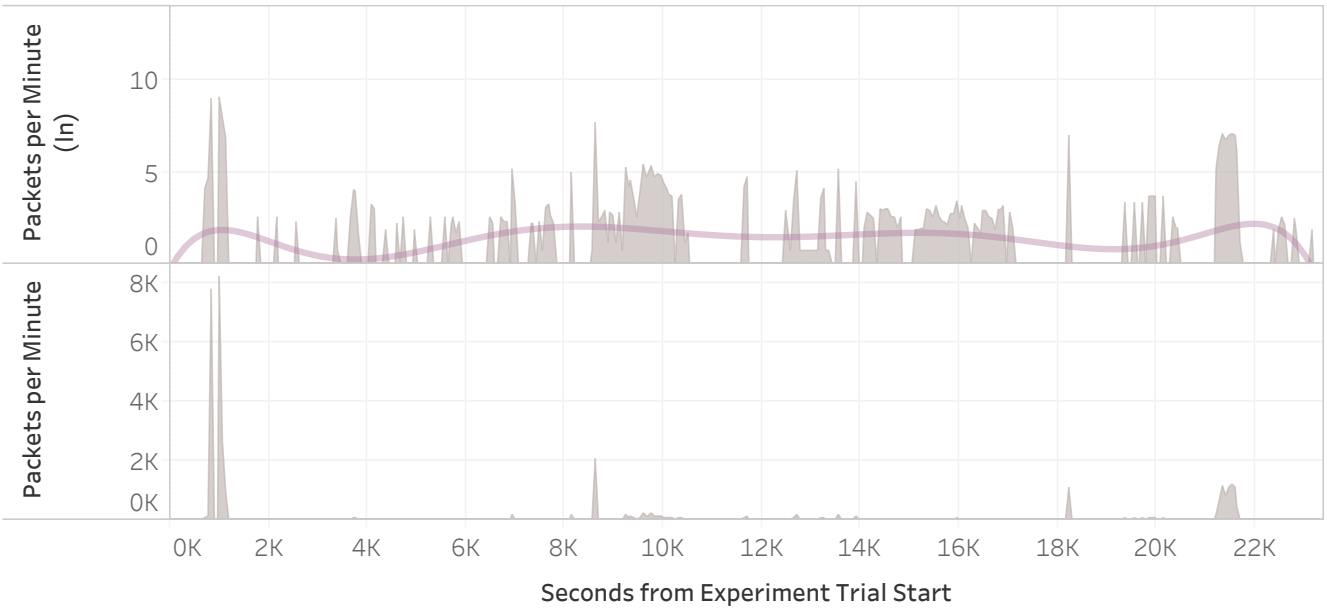


Running Sum of Packets

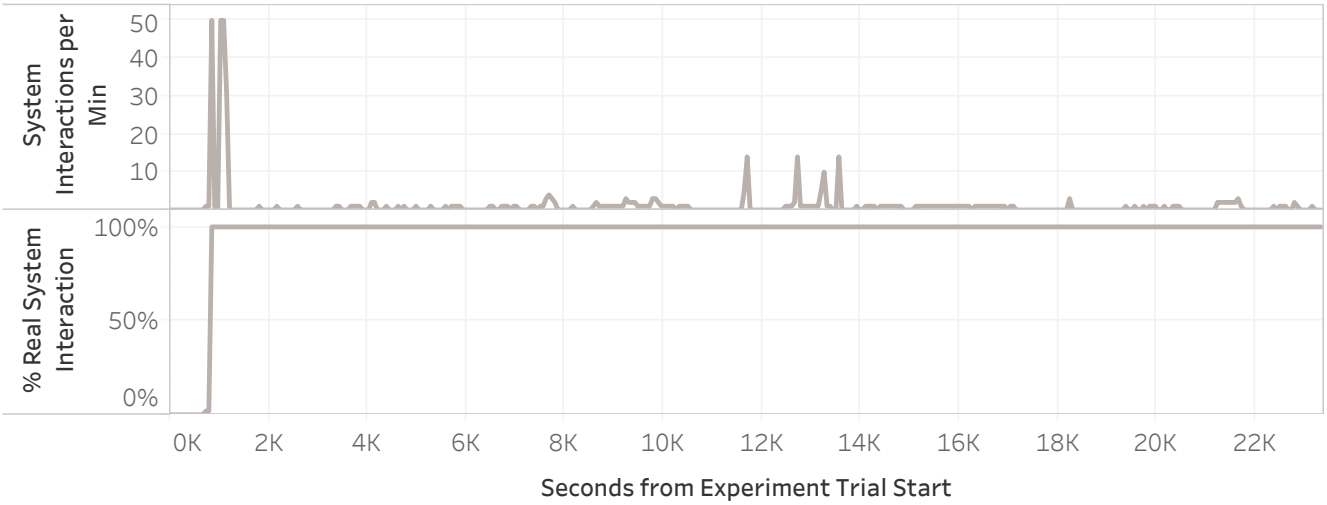


S98 - Day 2 - PIAU

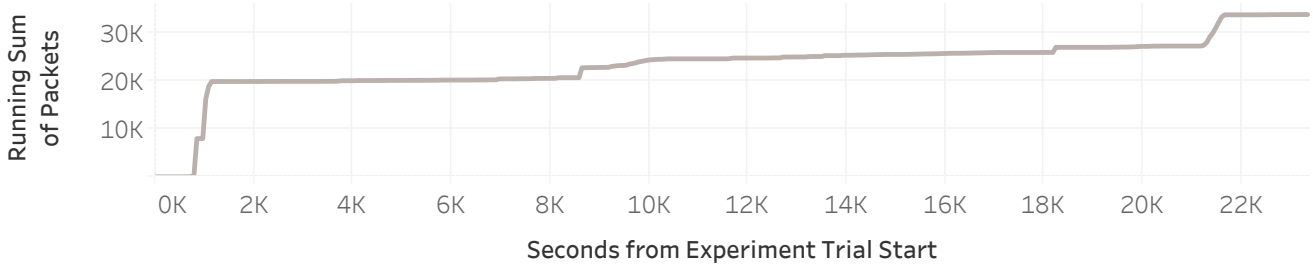
Real Packets per Minute



Real System Interaction Timeline

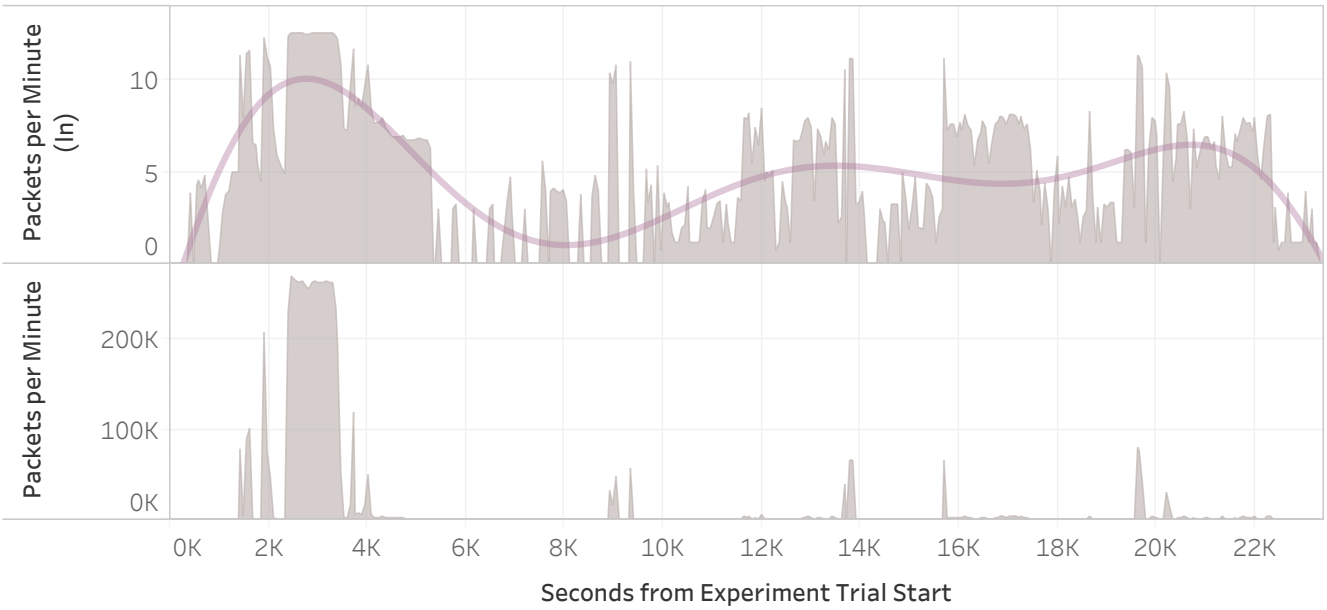


Running Sum of Packets

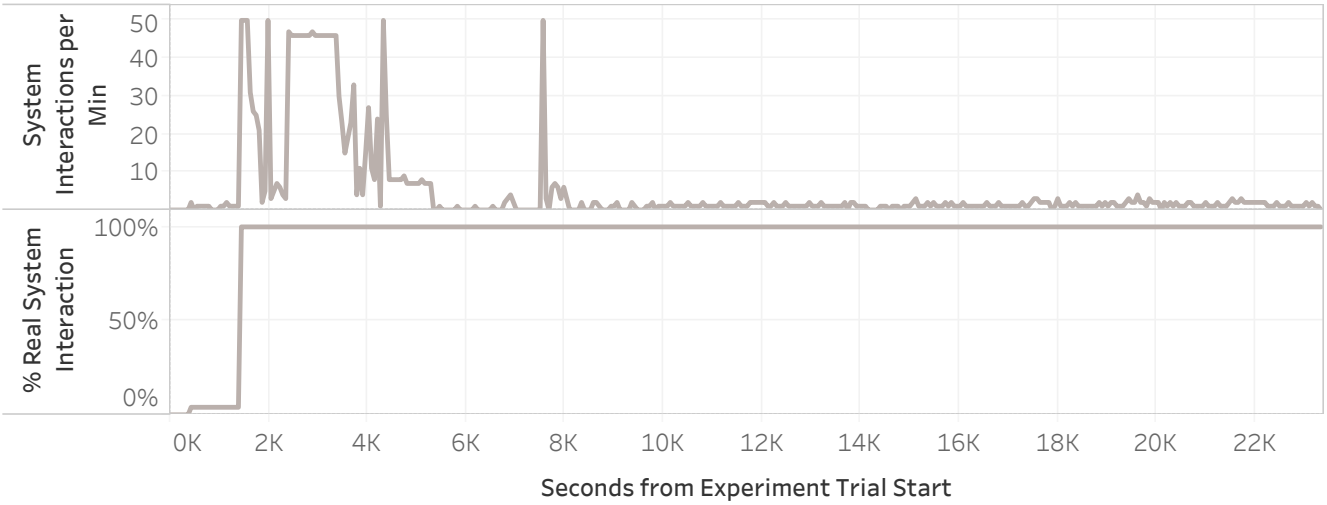


S99 - Day 2 - PIAU

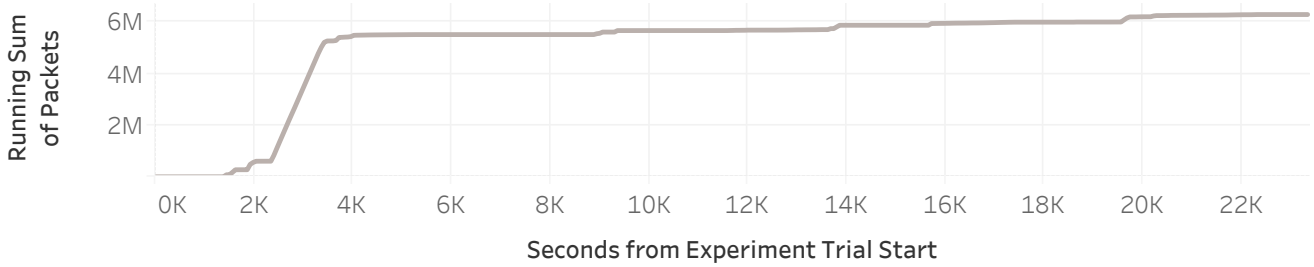
Real Packets per Minute



Real System Interaction Timeline



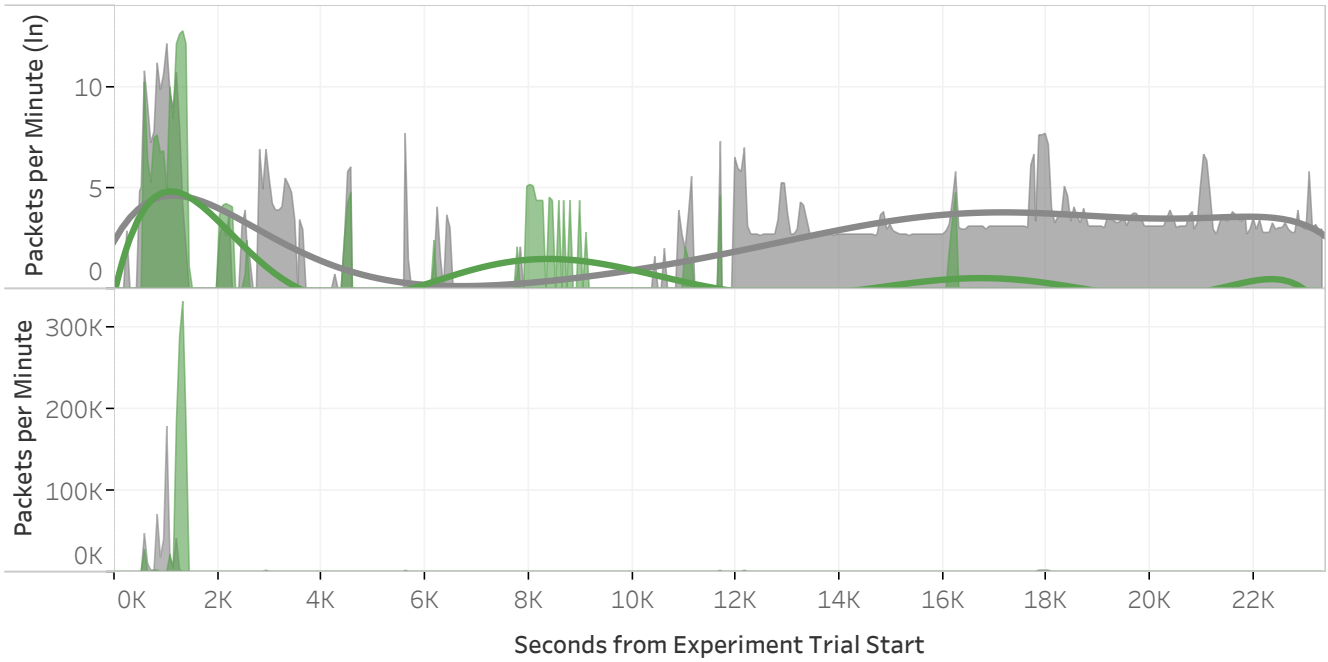
Running Sum of Packets



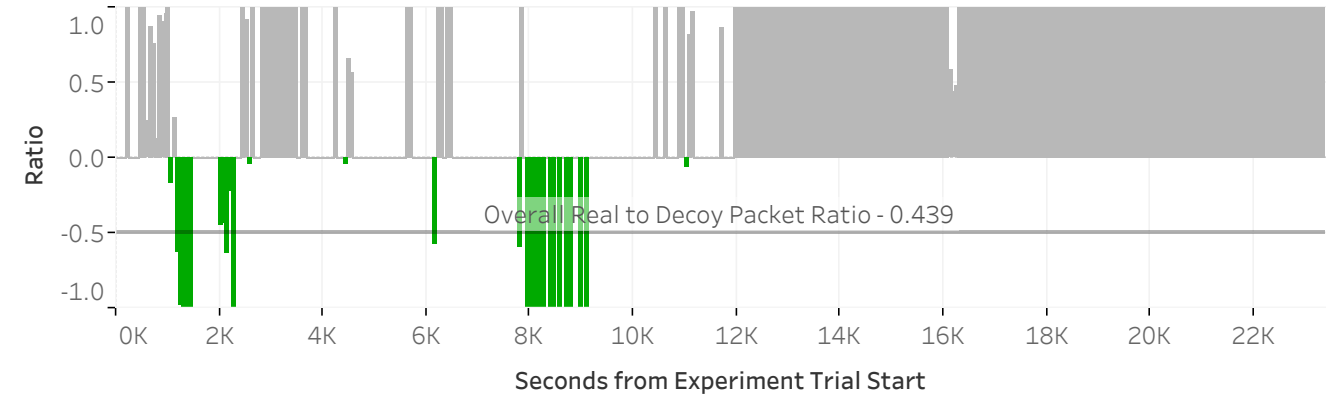
S100 - Day2 - AUPU

Legend
Real Systems
Decoy Systems

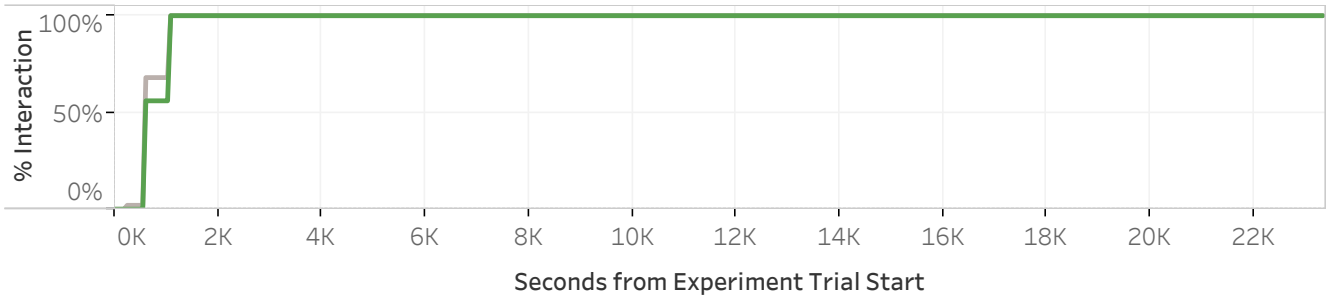
Real & Decoy Packets per Minute

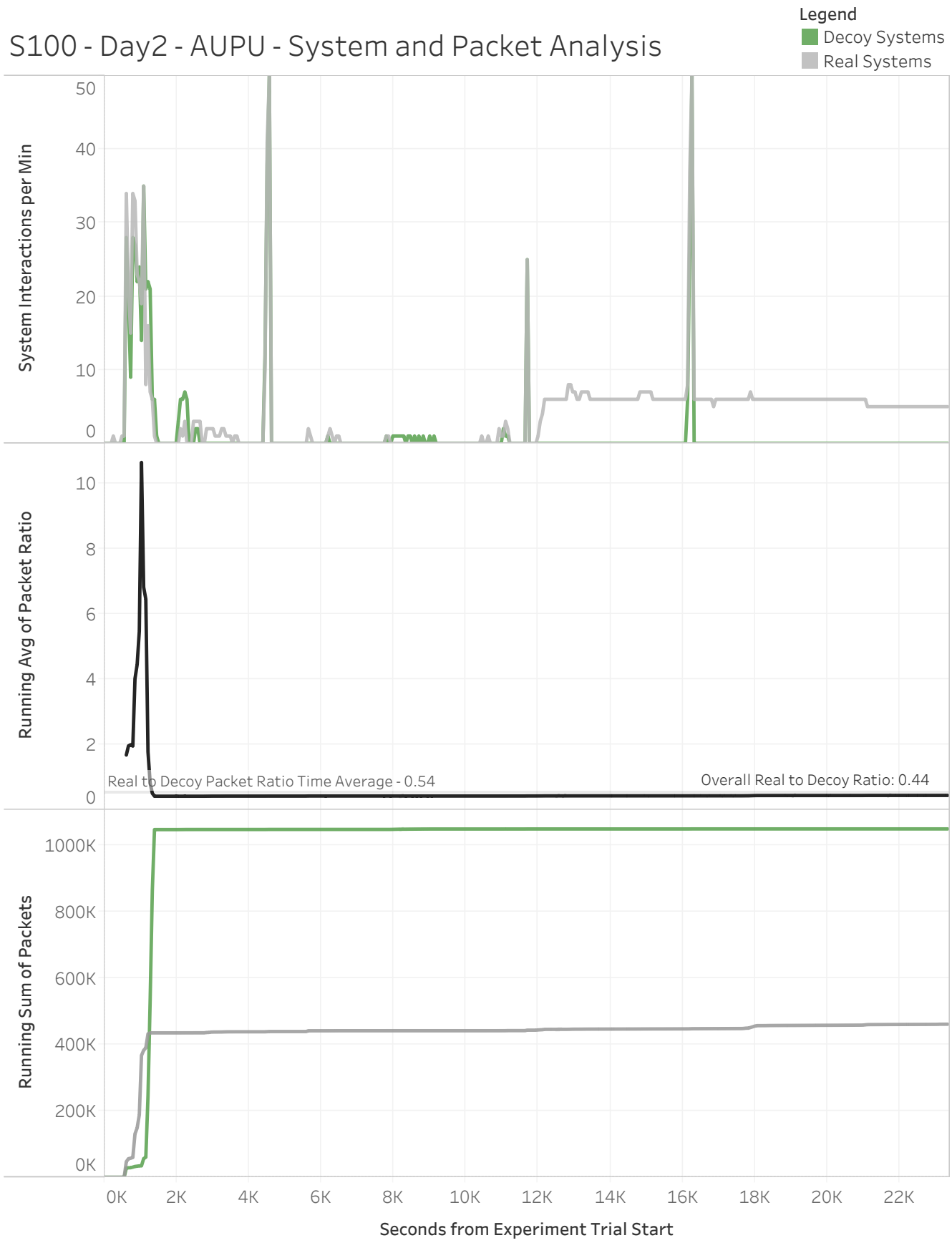


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

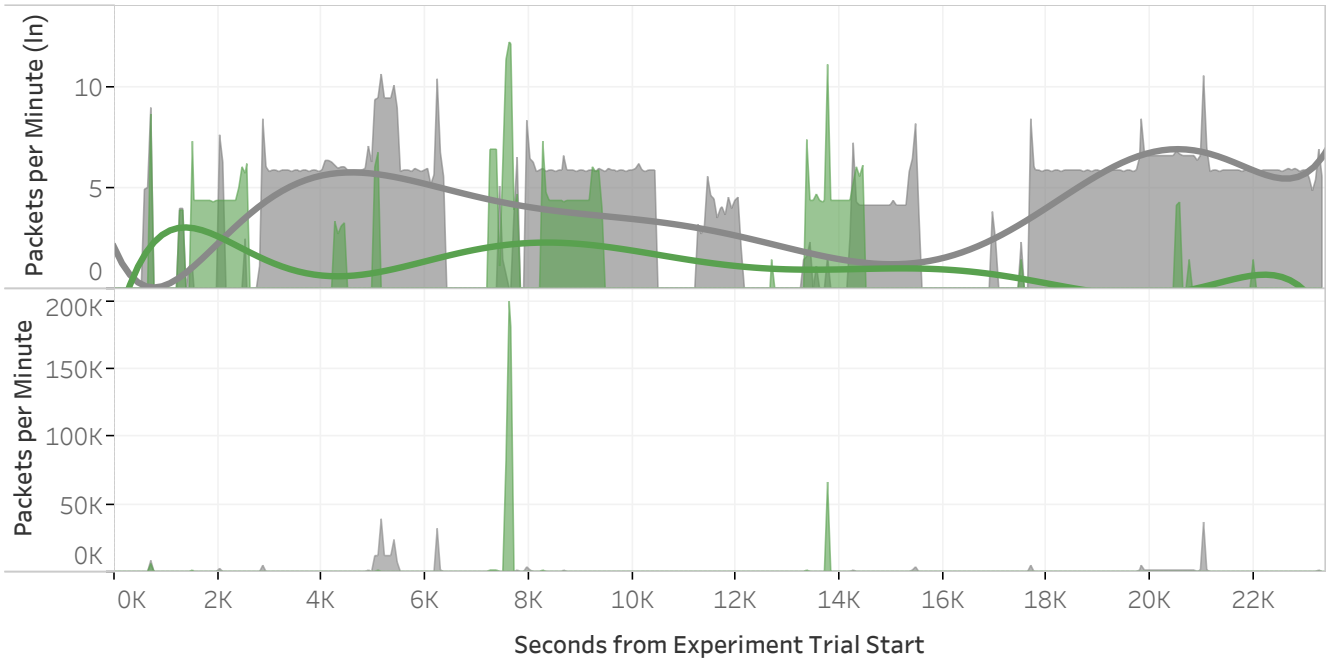



S100 - Day2 - AUPU - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
10
8
6
4
2
0
Real to Decoy Packet Ratio Time Average - 0.54
Overall Real to Decoy Ratio: 0.44
Running Sum of Packets
1000K
800K
600K
400K
200K
0K
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

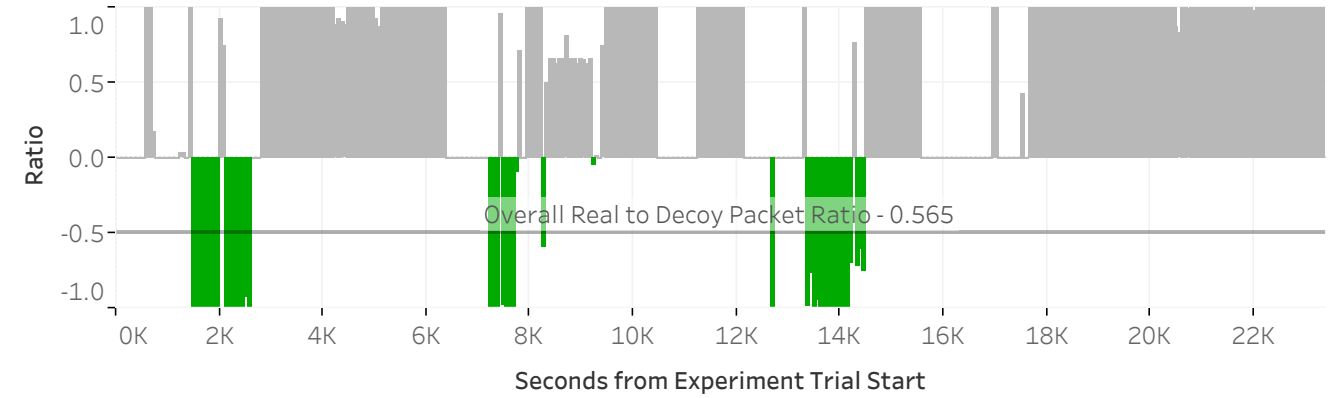
S101 - Day2 - AUPU

Legend
Real Systems
Decoy Systems

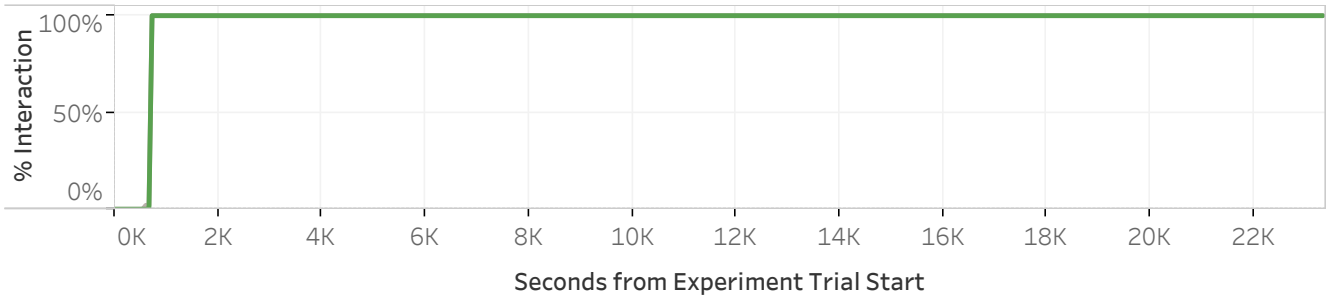
Real & Decoy Packets per Minute

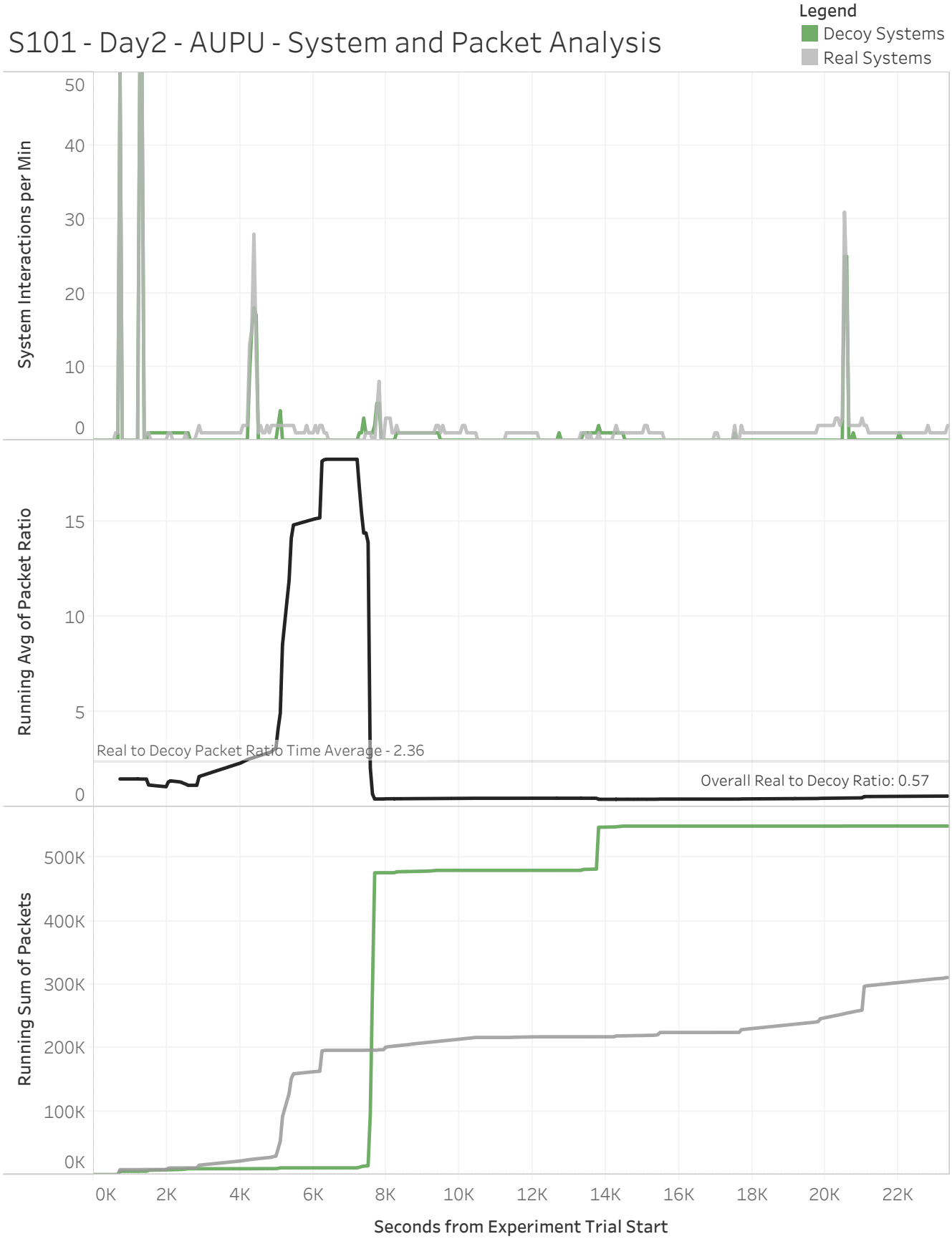


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

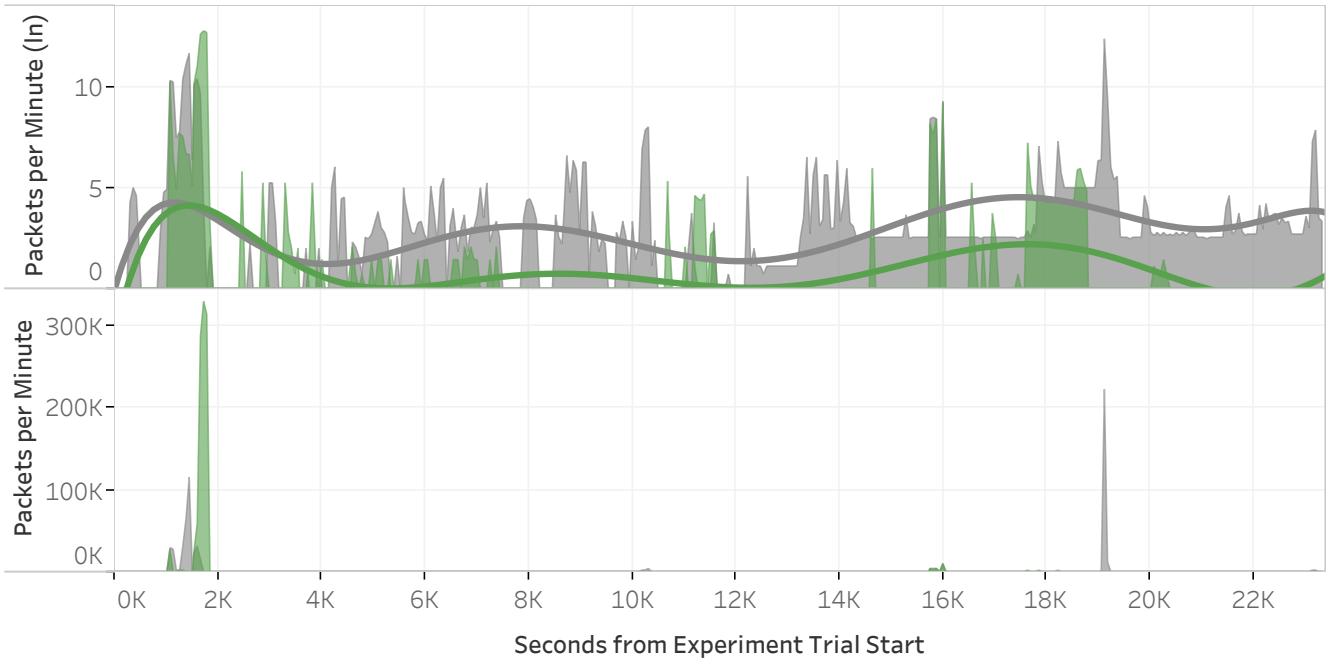



S101 - Day2 - AUPU - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
15
10
5
0
Real to Decoy Packet Ratio Time Average - 2.36
Overall Real to Decoy Ratio: 0.57
Running Sum of Packets
500K
400K
300K
200K
100K
0K
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

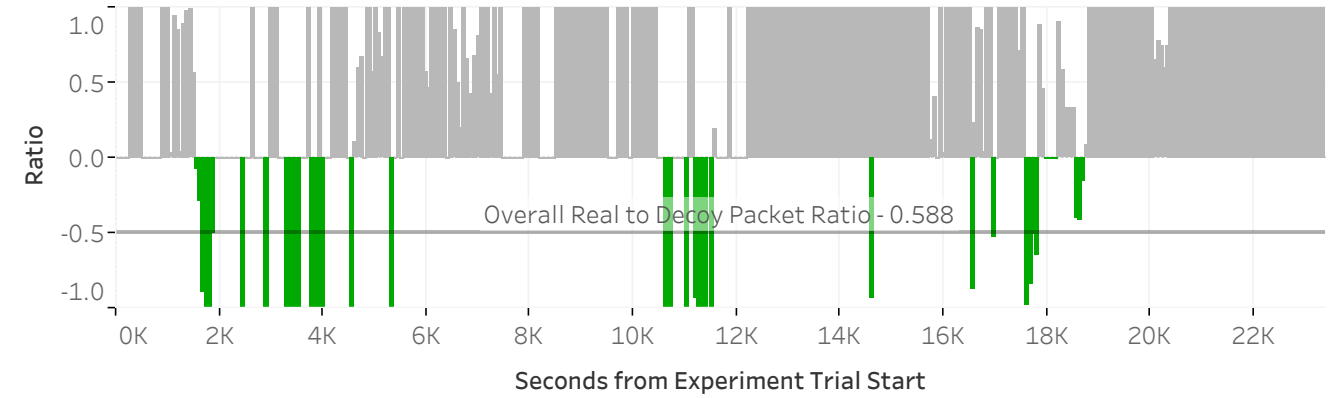
S102 - Day2 - AUPU

Legend
Real Systems
Decoy Systems

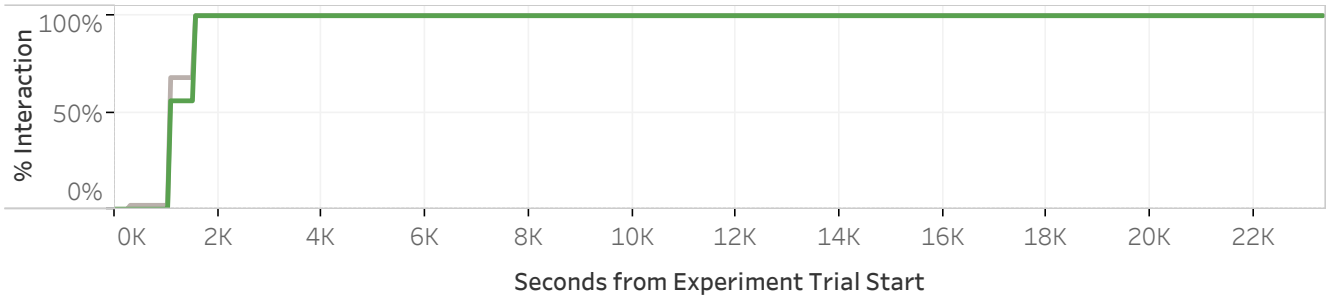
Real & Decoy Packets per Minute

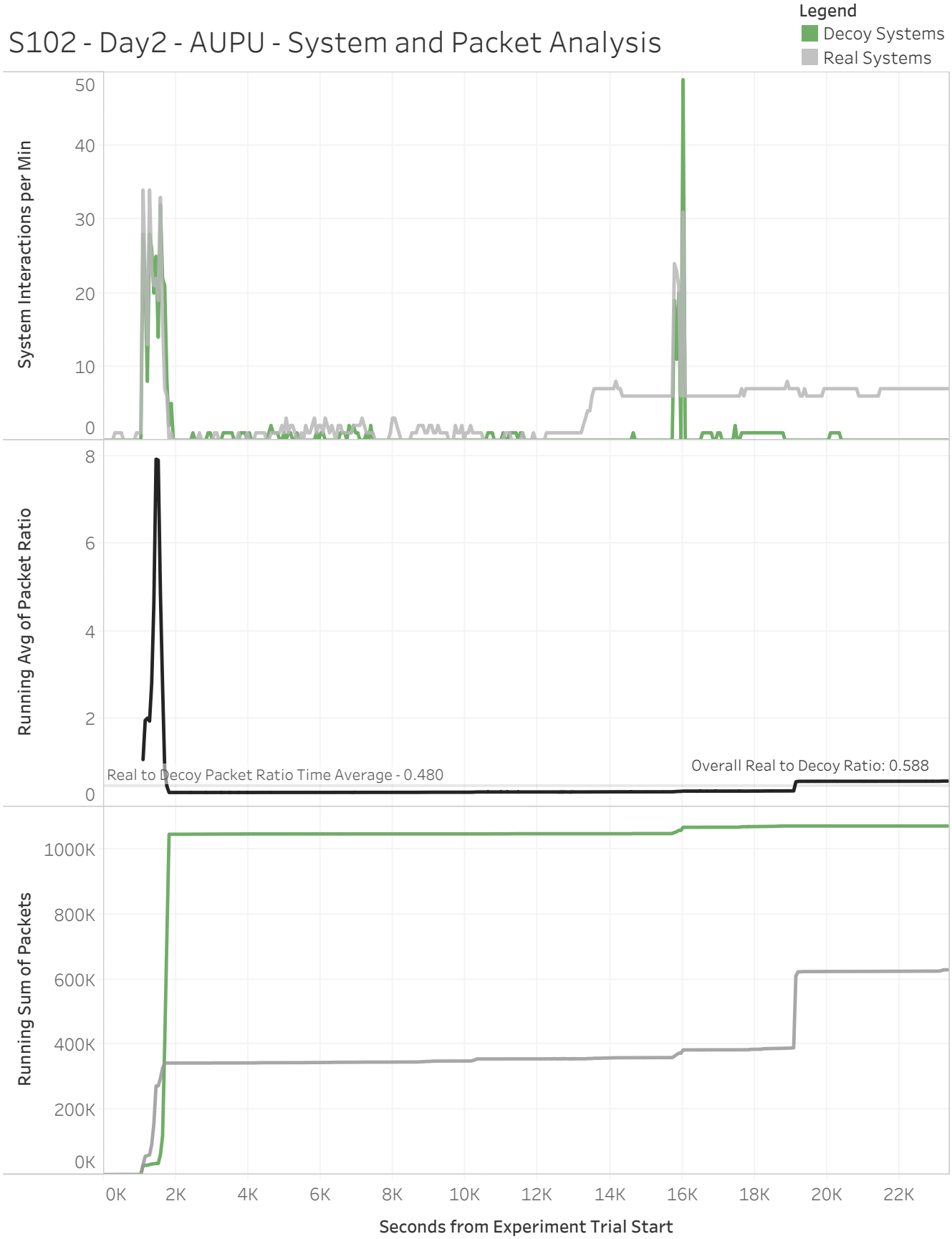


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

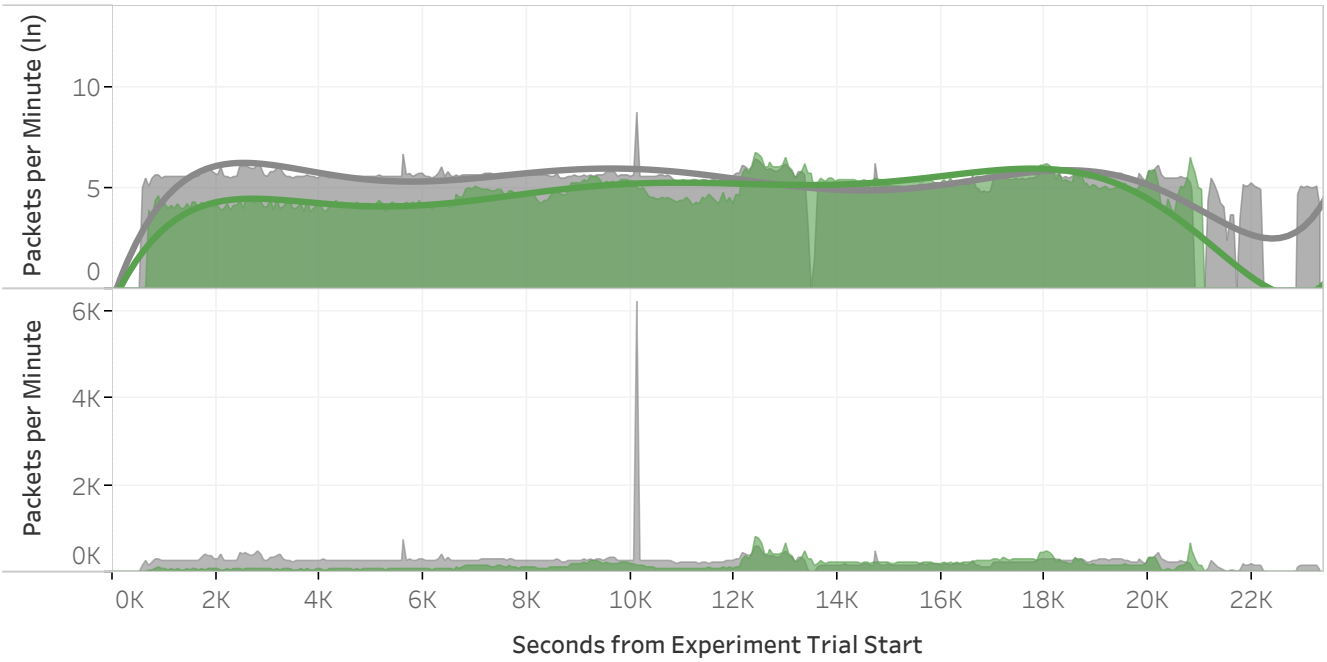



S102 - Day2 - AUPU - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
8
6
4
2
0
Real to Decoy Packet Ratio Time Average - 0.480
Overall Real to Decoy Ratio: 0.588
Running Sum of Packets
1000K
800K
600K
400K
200K
0K
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

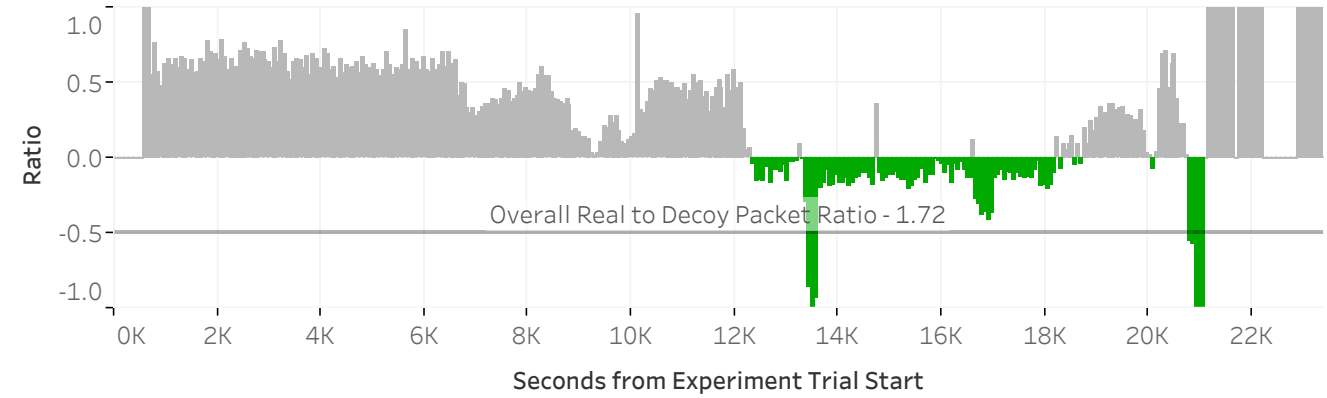
S103 - Day2 - AUPU

Legend
Real Systems
Decoy Systems

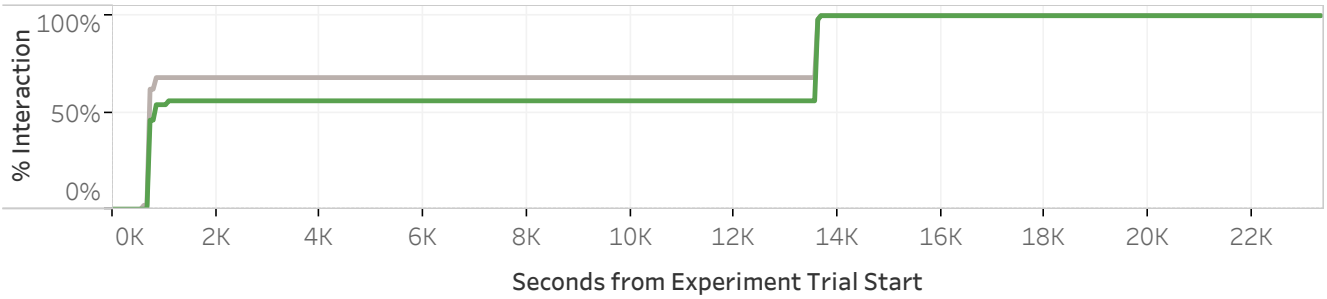
Real & Decoy Packets per Minute

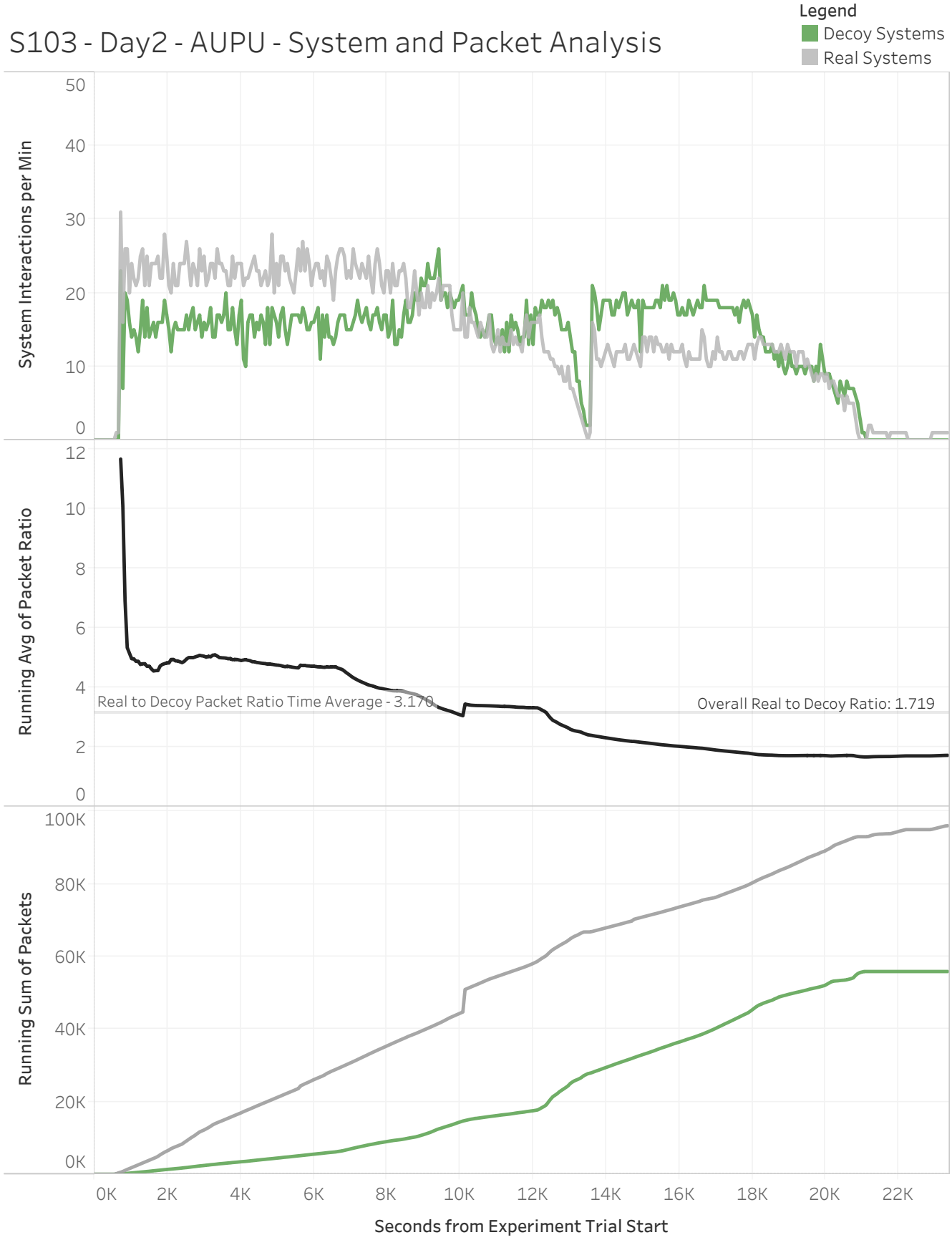


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

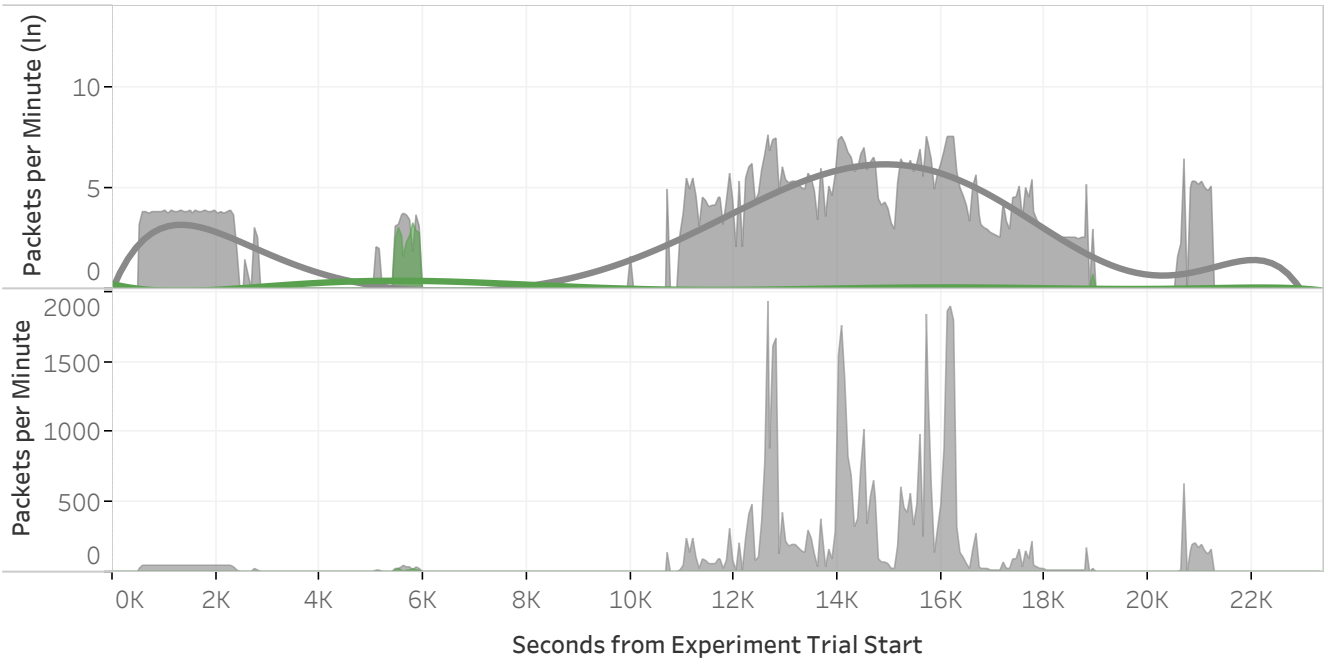



S103 - Day2 - AUPU - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
12
10
8
6
4
2
0
Real to Decoy Packet Ratio Time Average - 3.170
Overall Real to Decoy Ratio: 1.719
Running Sum of Packets
100K
80K
60K
40K
20K
0K
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

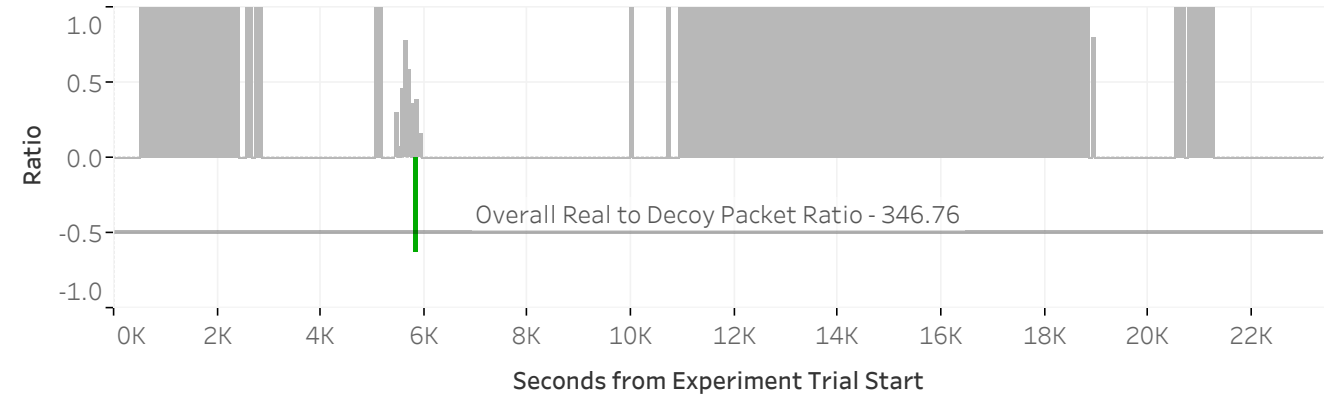
S104 - Day2 - AUPU

Legend
Real Systems
Decoy Systems

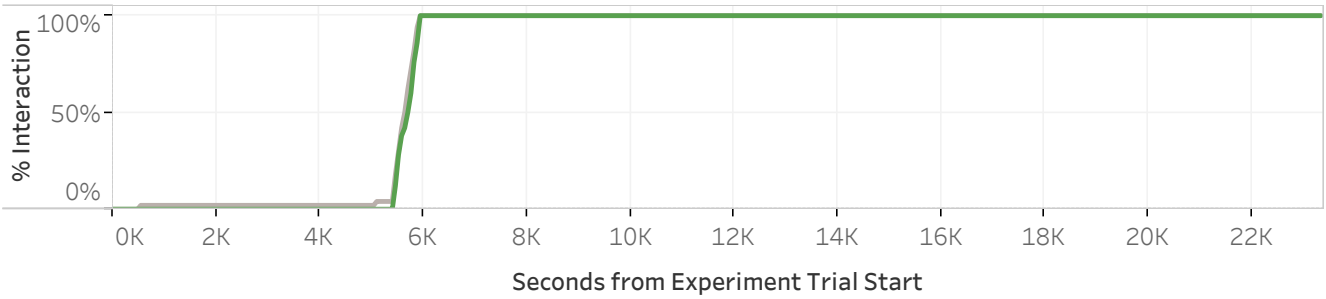
Real & Decoy Packets per Minute

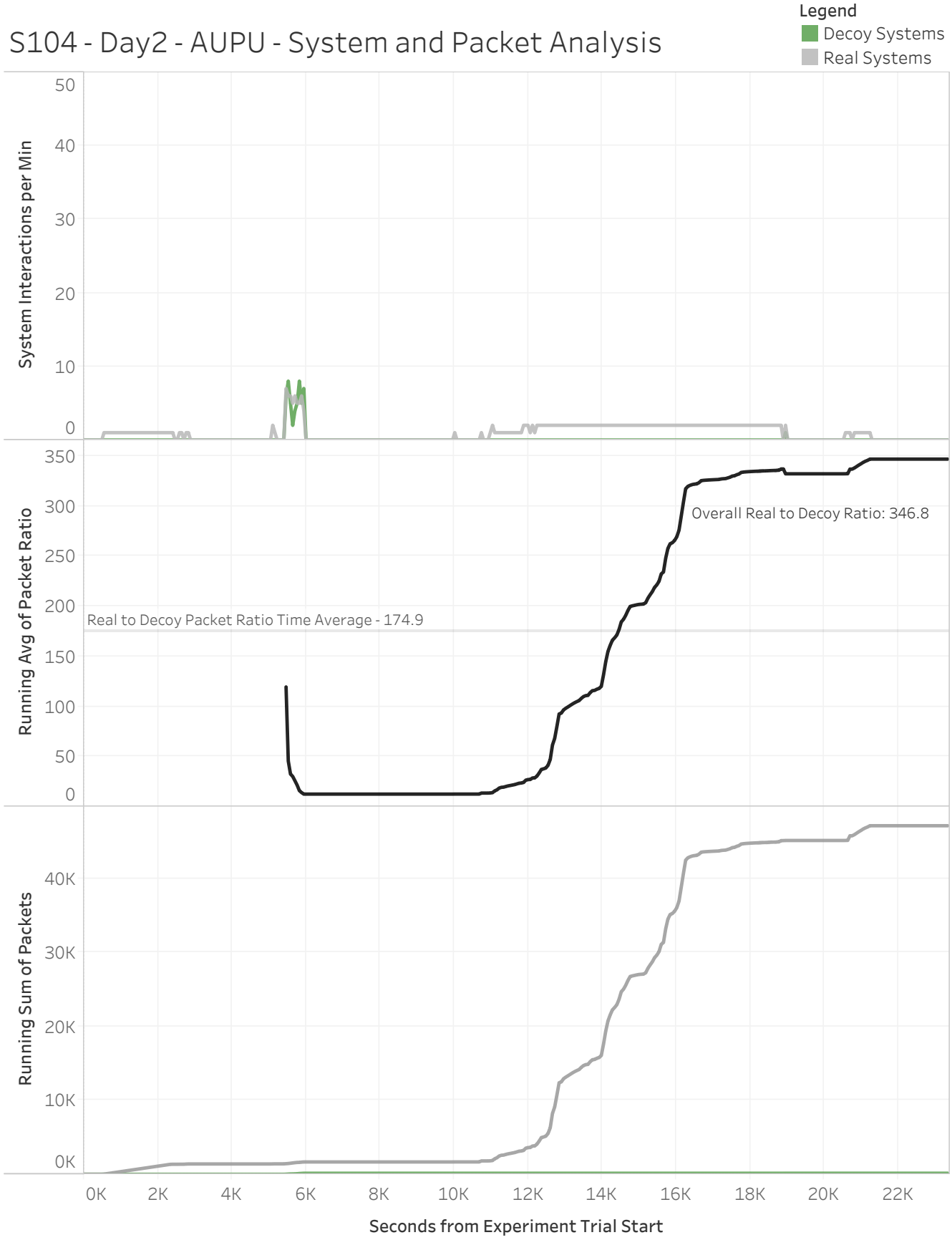


Real to Decoy Packet Ratio



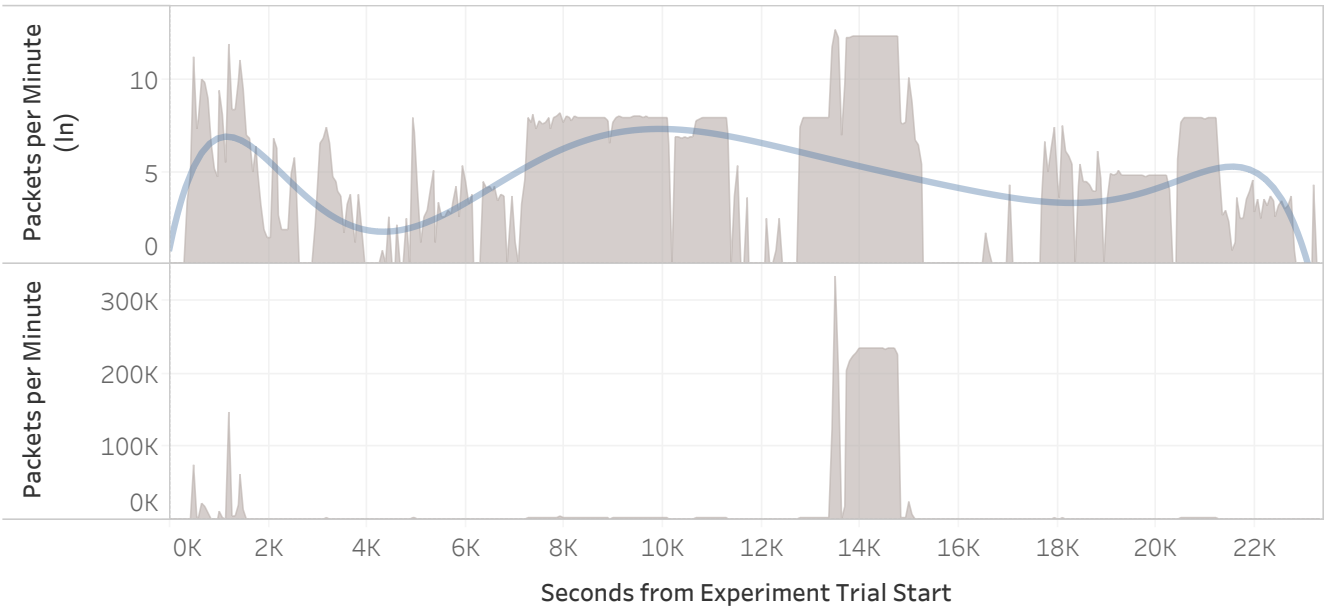
Real & Decoy System Interaction Timeline



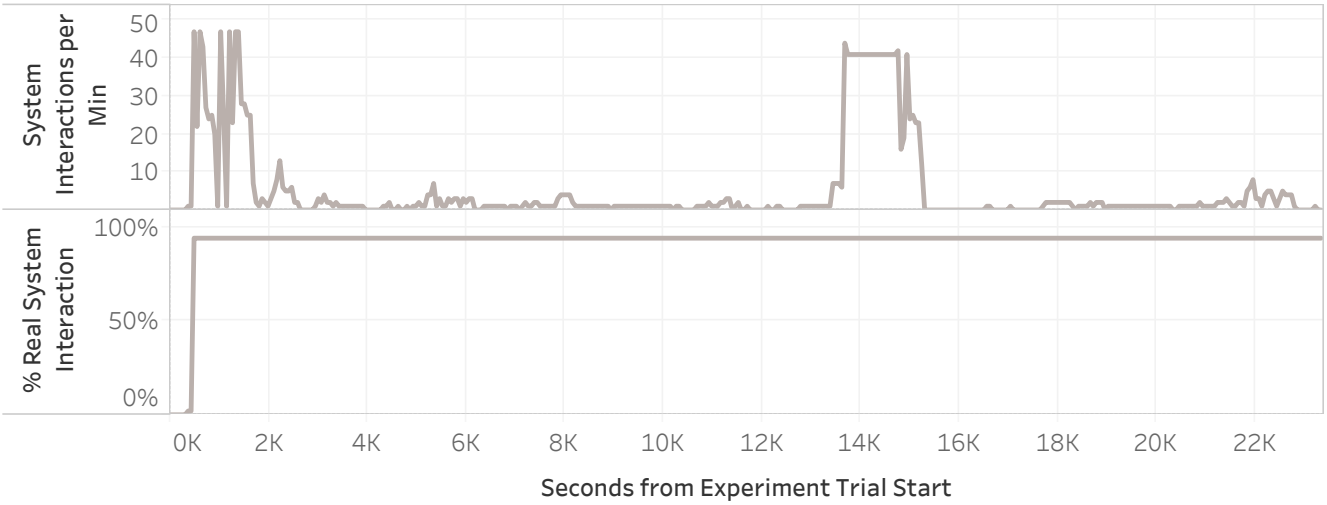

S104 - Day2 - AUPU - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
350
300
250
200
150
100
50
0
Overall Real to Decoy Ratio: 346.8
Real to Decoy Packet Ratio Time Average - 174.9
Running Sum of Packets
40K
30K
20K
10K
0K
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

S105 - Day 2 - AIAU

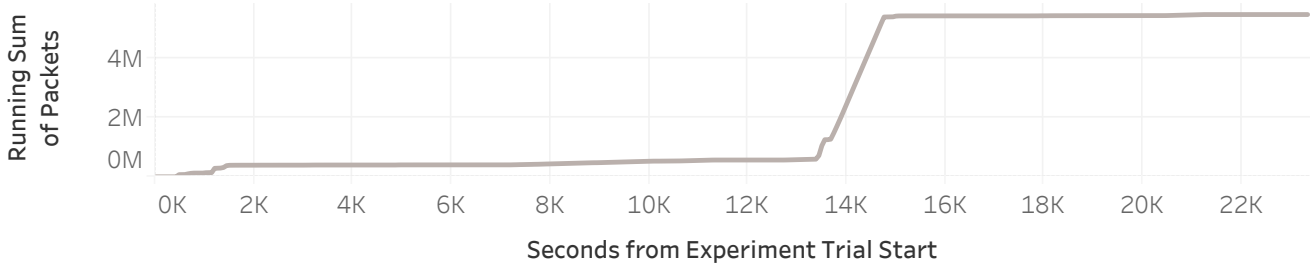
Real Packets per Minute



Real System Interaction Timeline

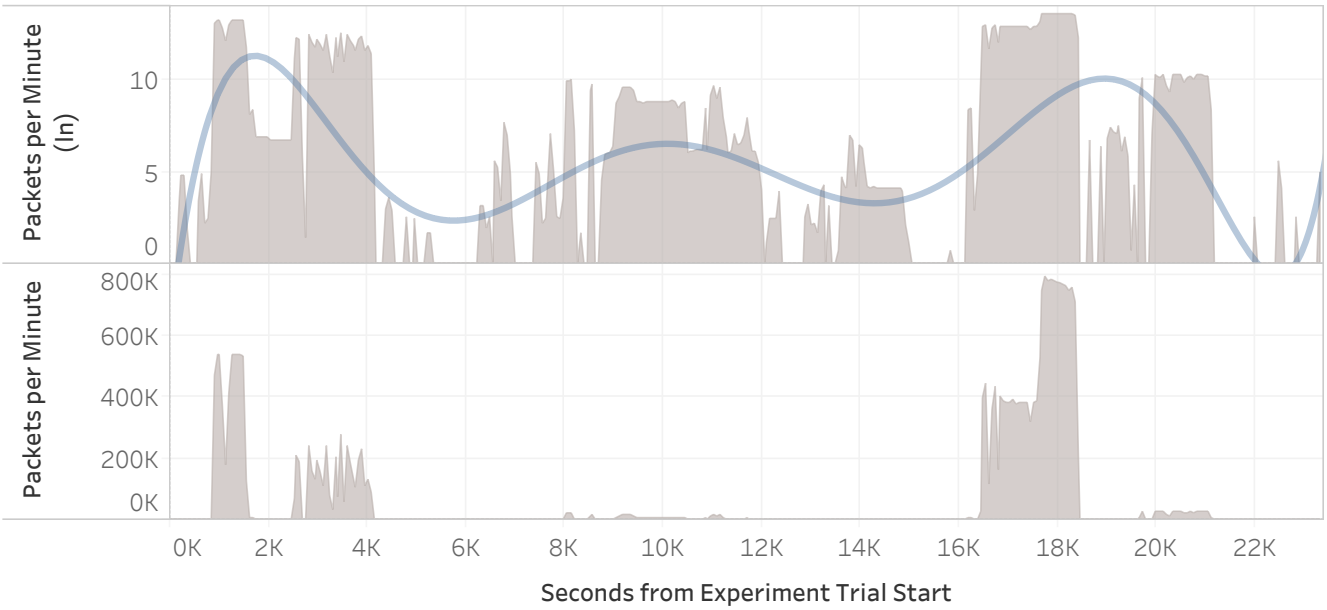


Running Sum of Packets

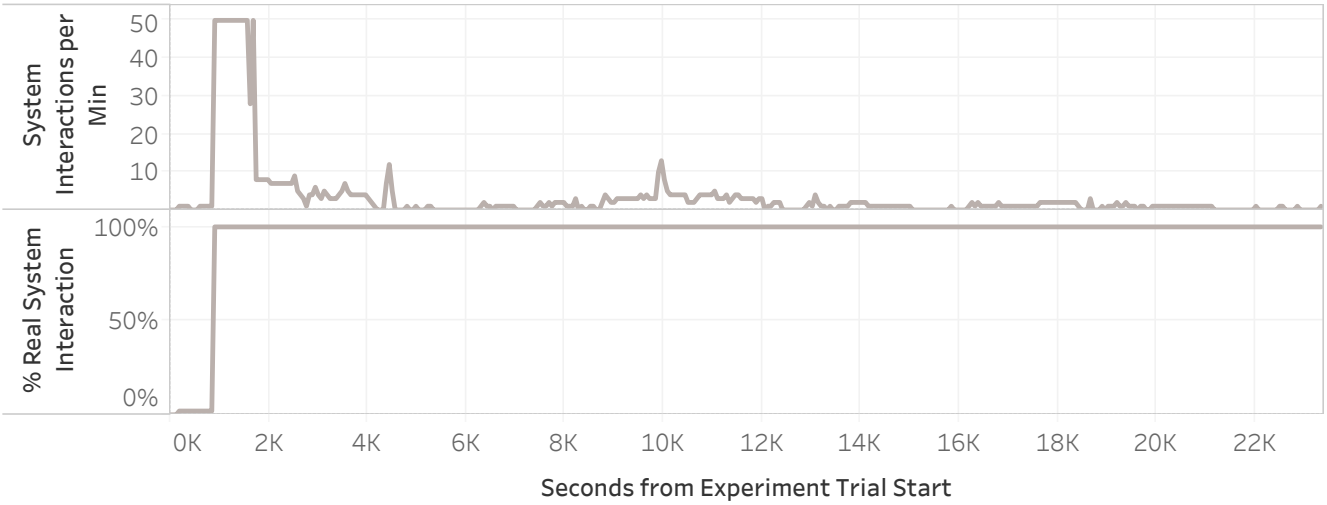


S106 - Day 2 - AIAU

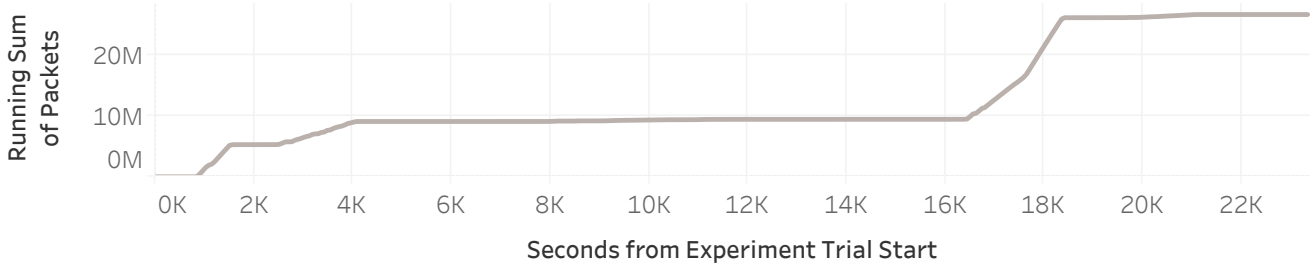
Real Packets per Minute



Real System Interaction Timeline

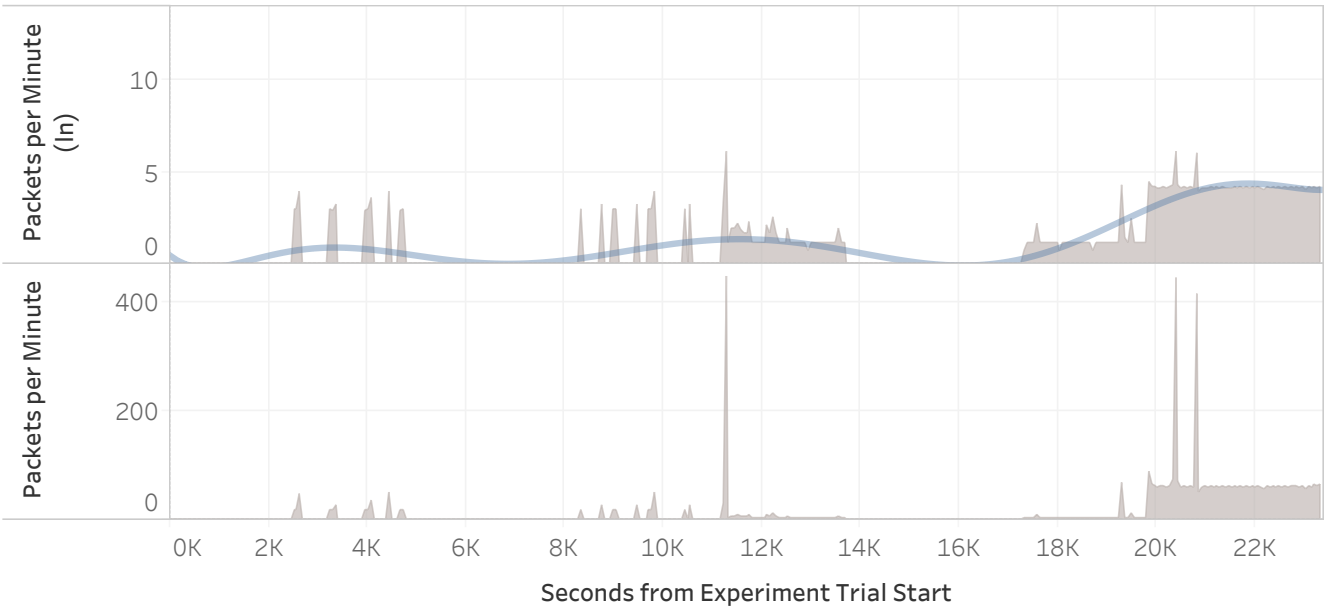


Running Sum of Packets

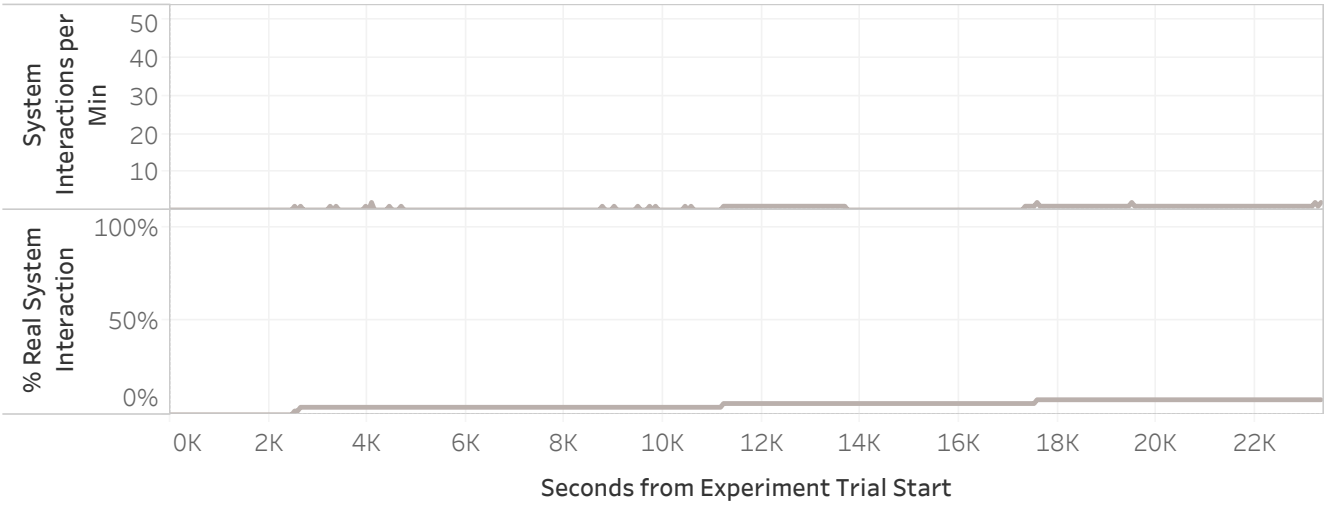


S107 - Day 2 - AIAU

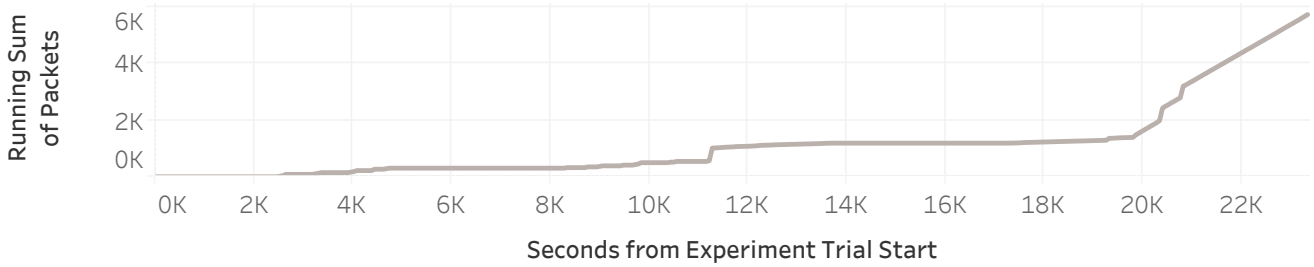
Real Packets per Minute



Real System Interaction Timeline

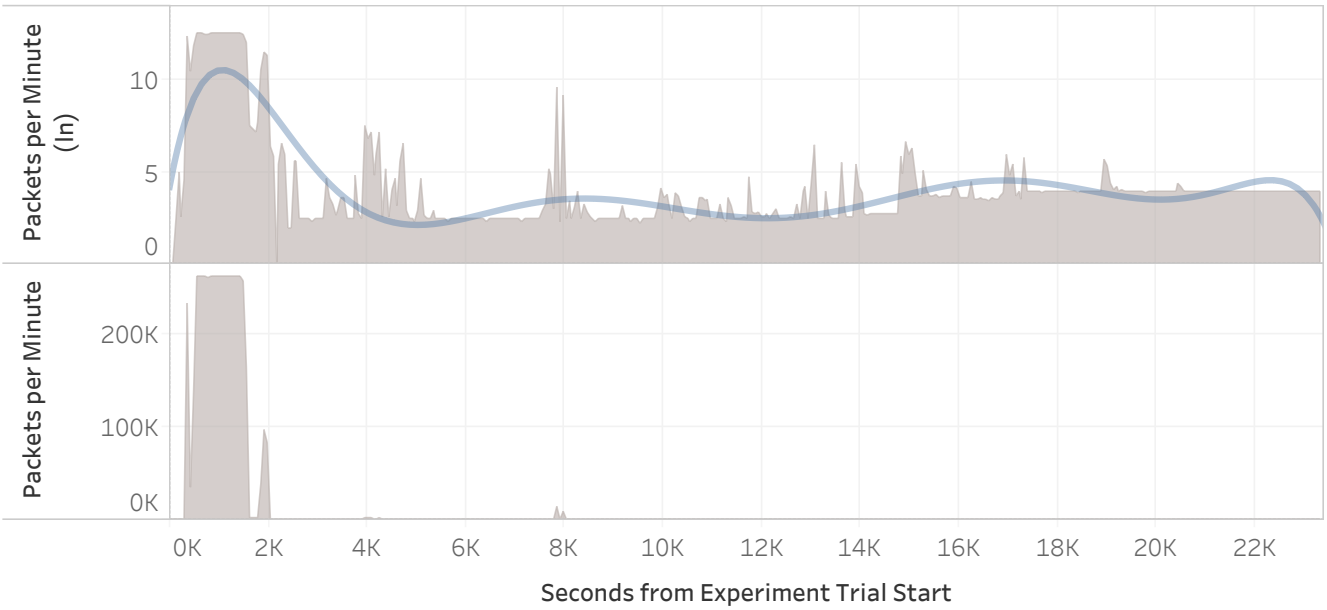


Running Sum of Packets

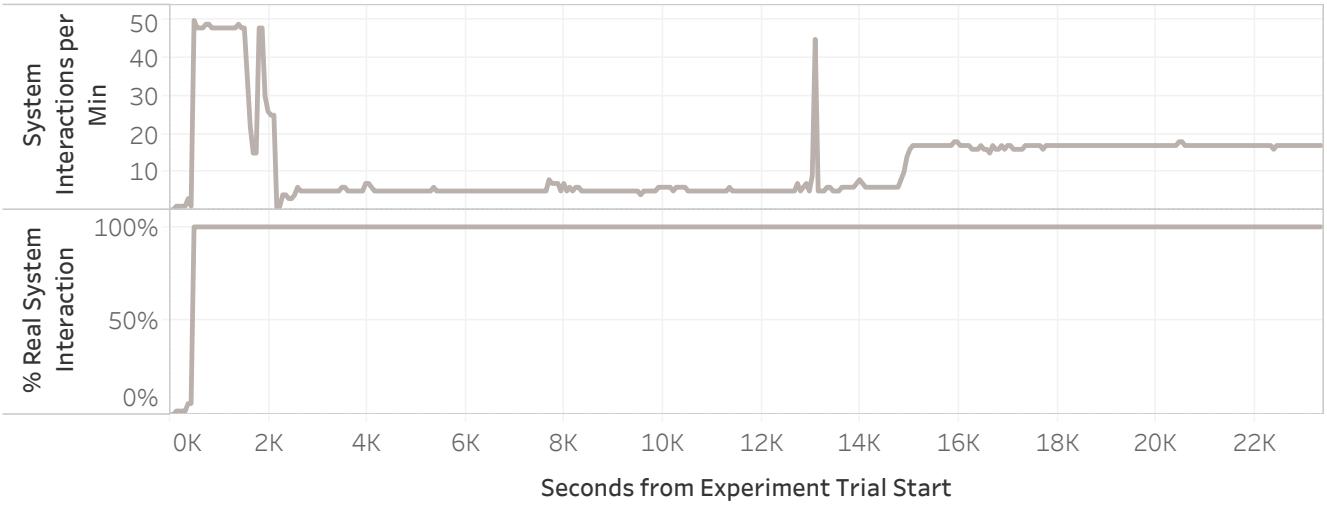


S108 - Day 2 - AIAU

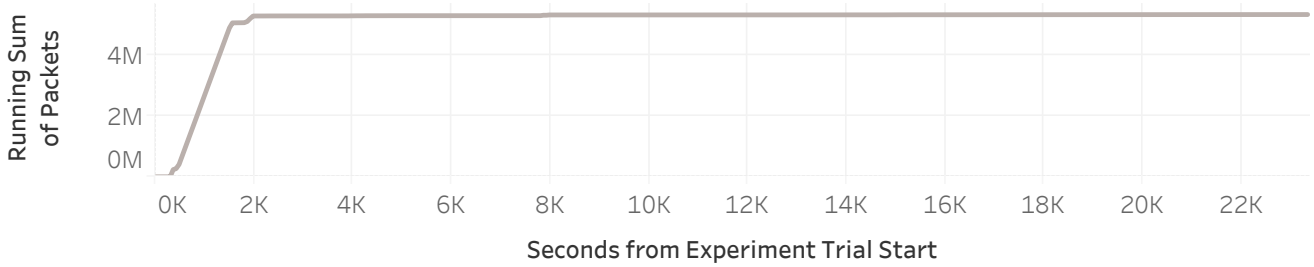
Real Packets per Minute



Real System Interaction Timeline

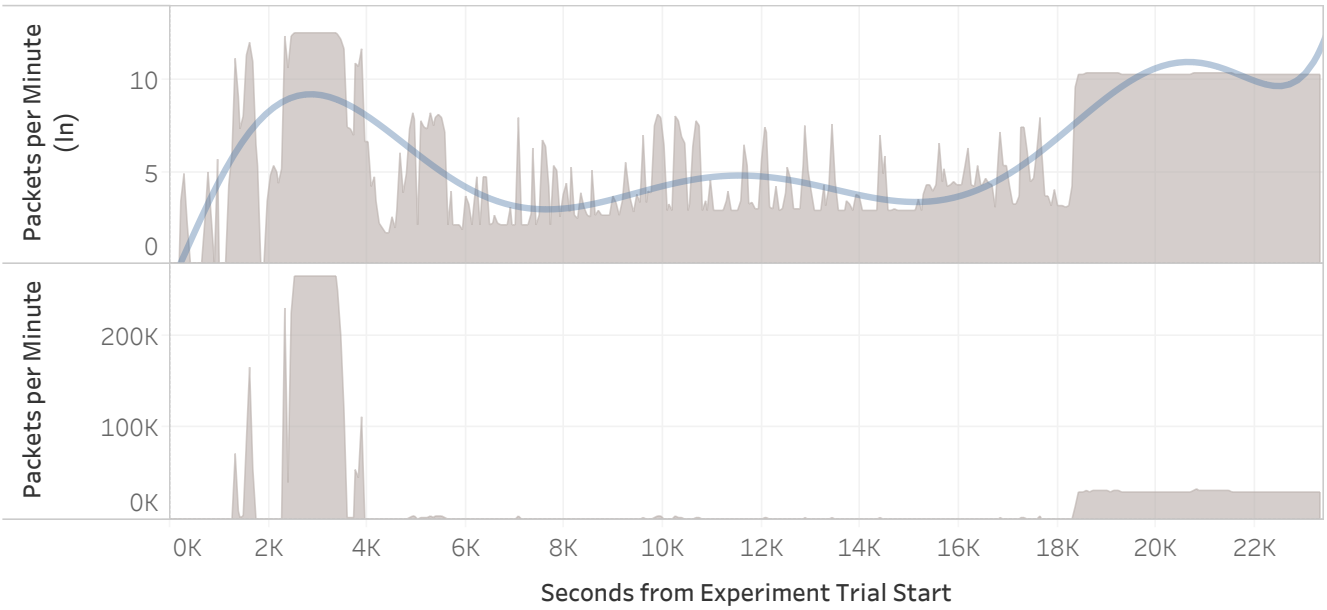


Running Sum of Packets

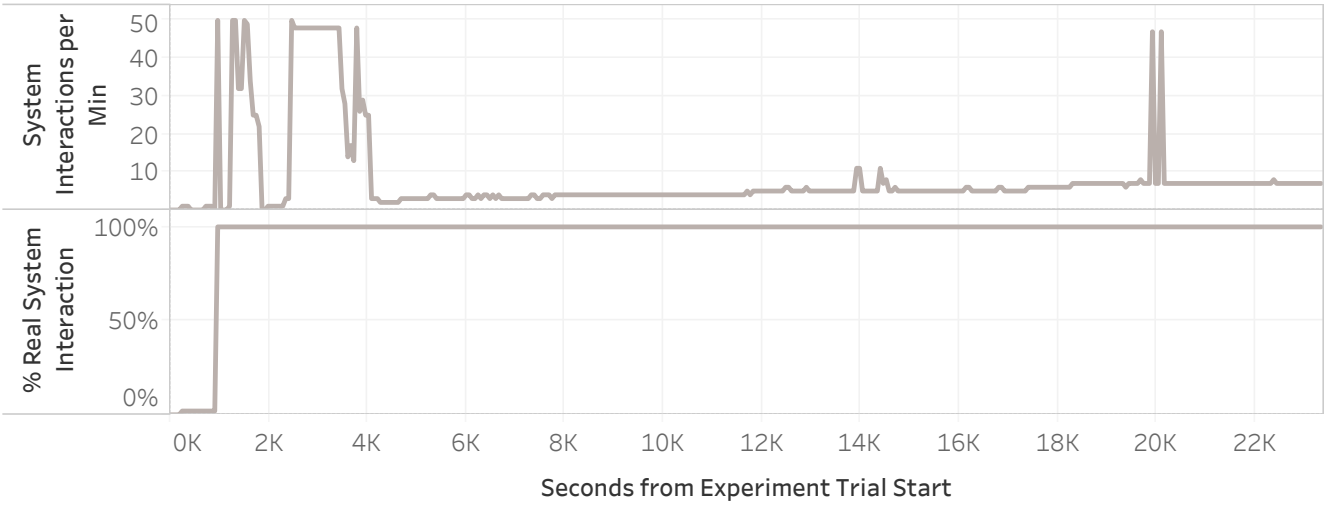


S109 - Day 2 - AIAU

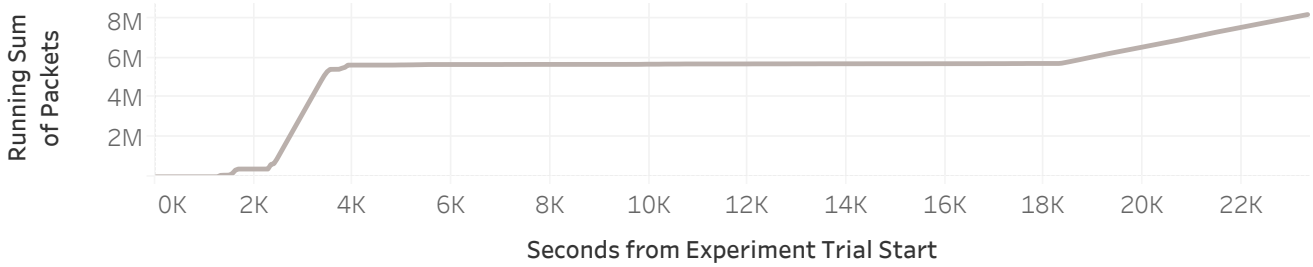
Real Packets per Minute



Real System Interaction Timeline



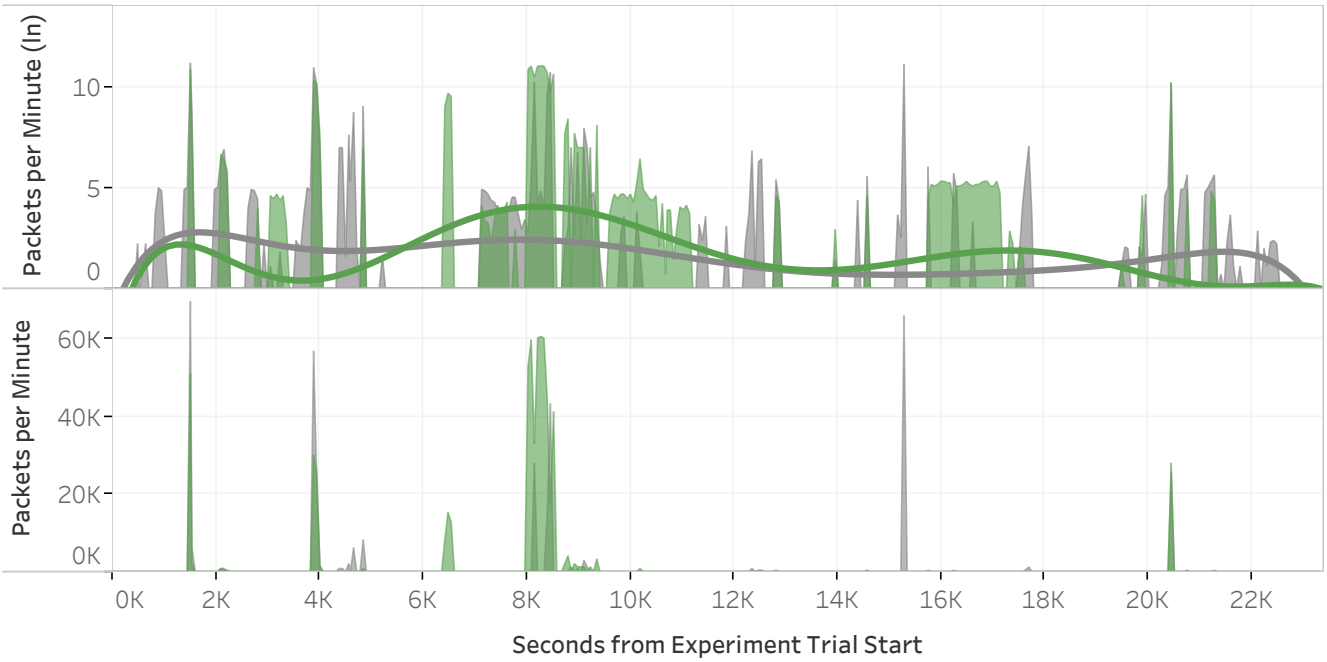
Running Sum of Packets



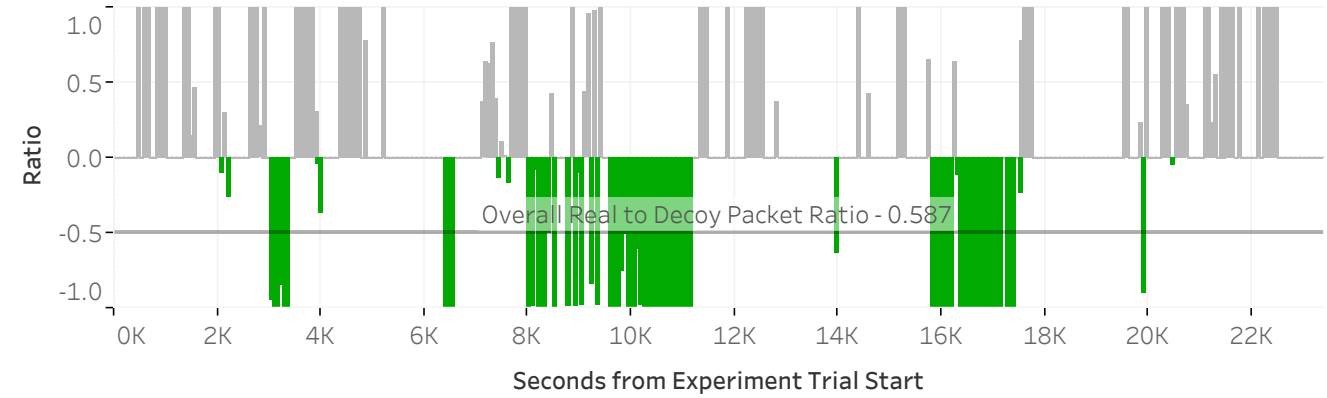
S111 - Day2 - AUPU

Legend
Real Systems
Decoy Systems

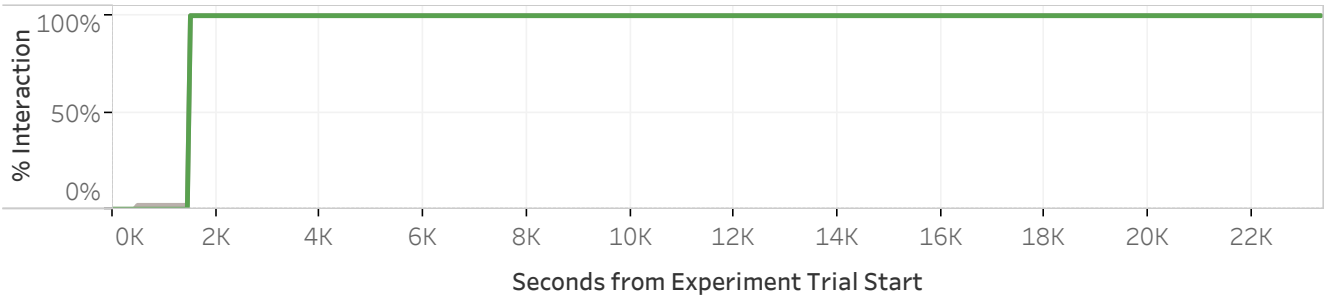
Real & Decoy Packets per Minute

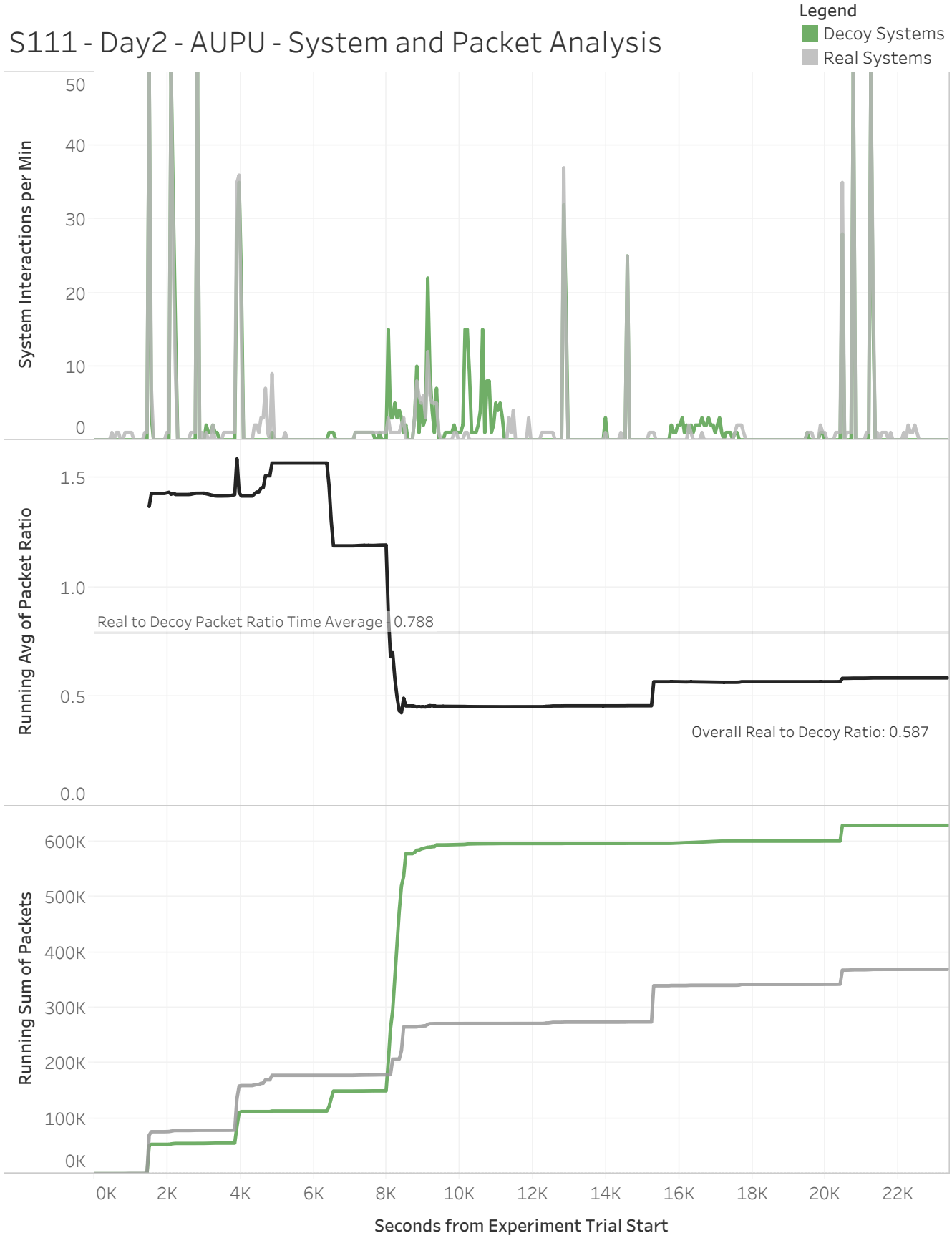


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

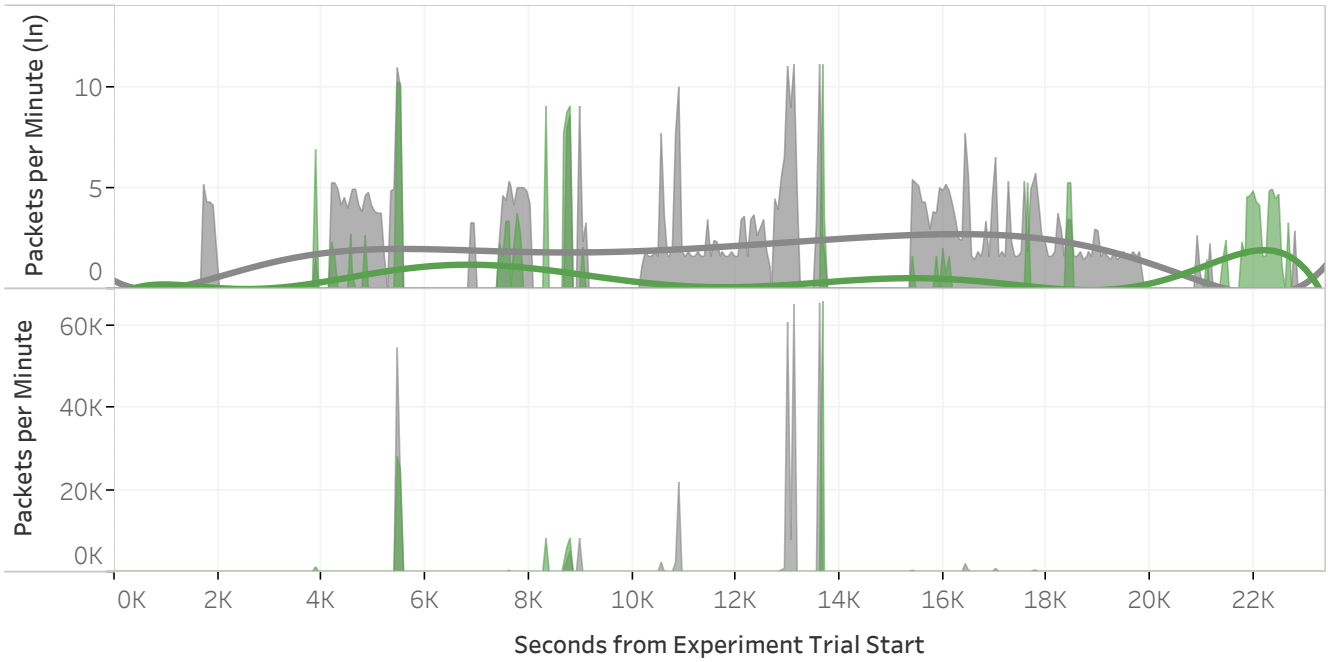



S111 - Day2 - AUPU - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
1.5
1.0
0.5
0.0
Real to Decoy Packet Ratio Time Average: 0.788
Overall Real to Decoy Ratio: 0.587
Running Sum of Packets
600K
500K
400K
300K
200K
100K
0K
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

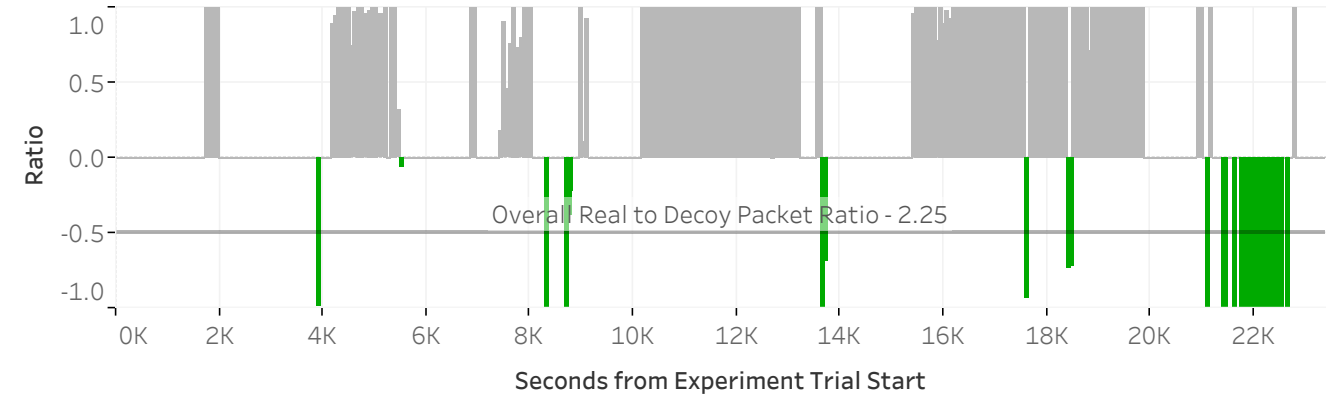
S112 - Day2 - AUPU

Legend
Real Systems
Decoy Systems

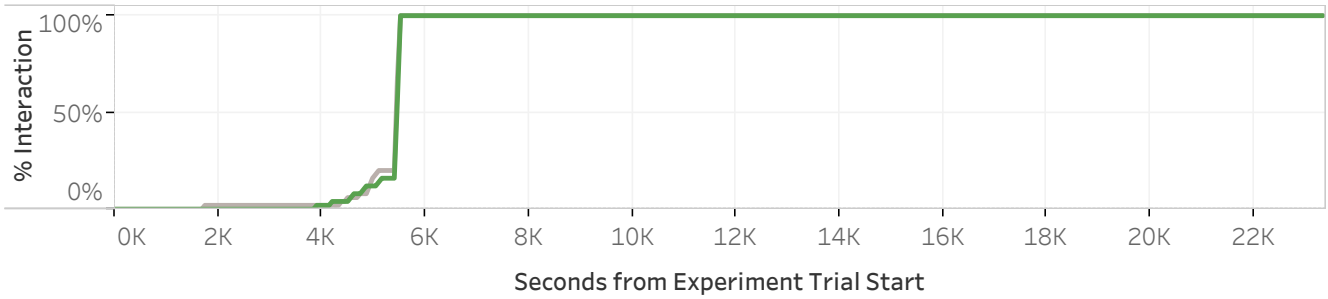
Real & Decoy Packets per Minute

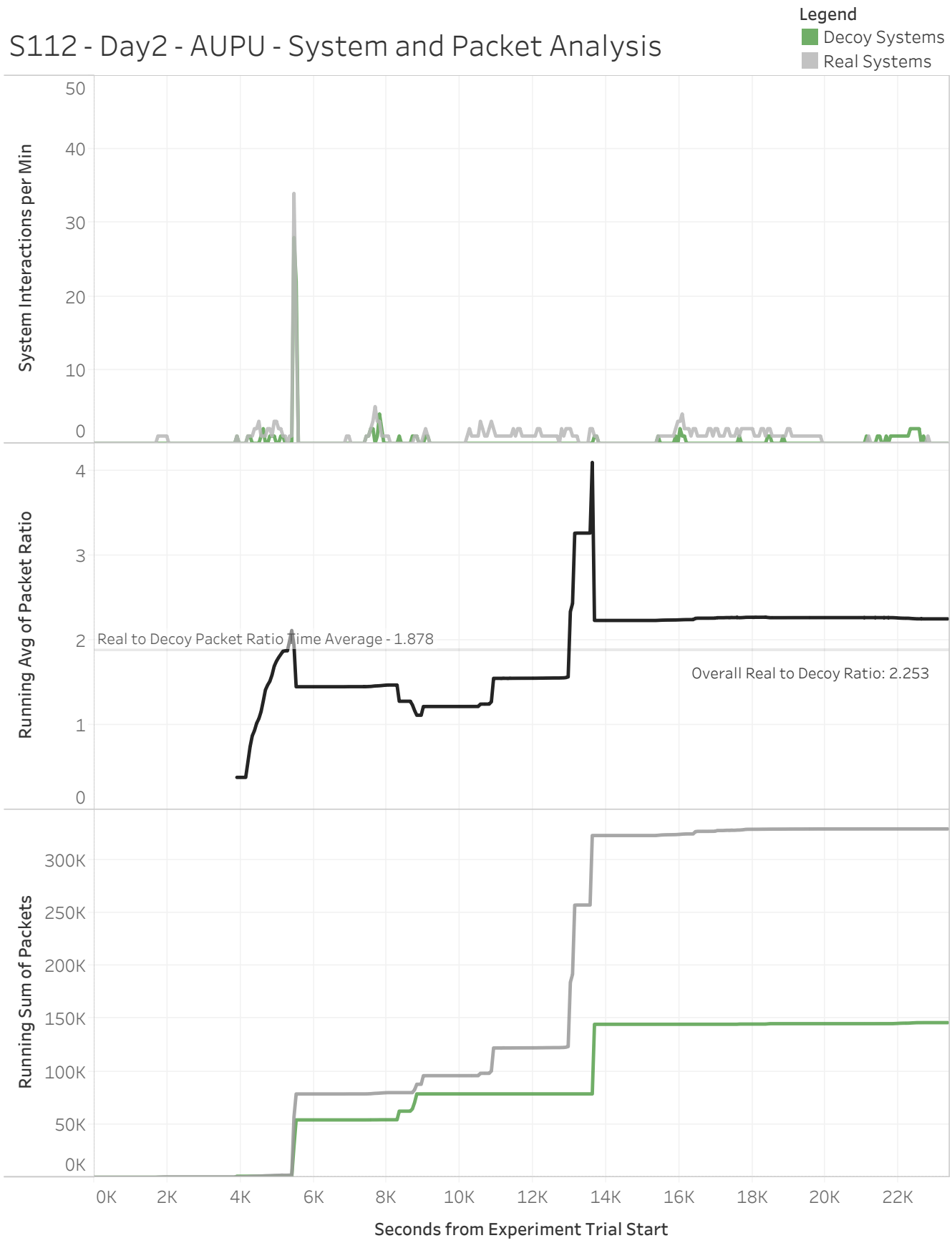


Real to Decoy Packet Ratio



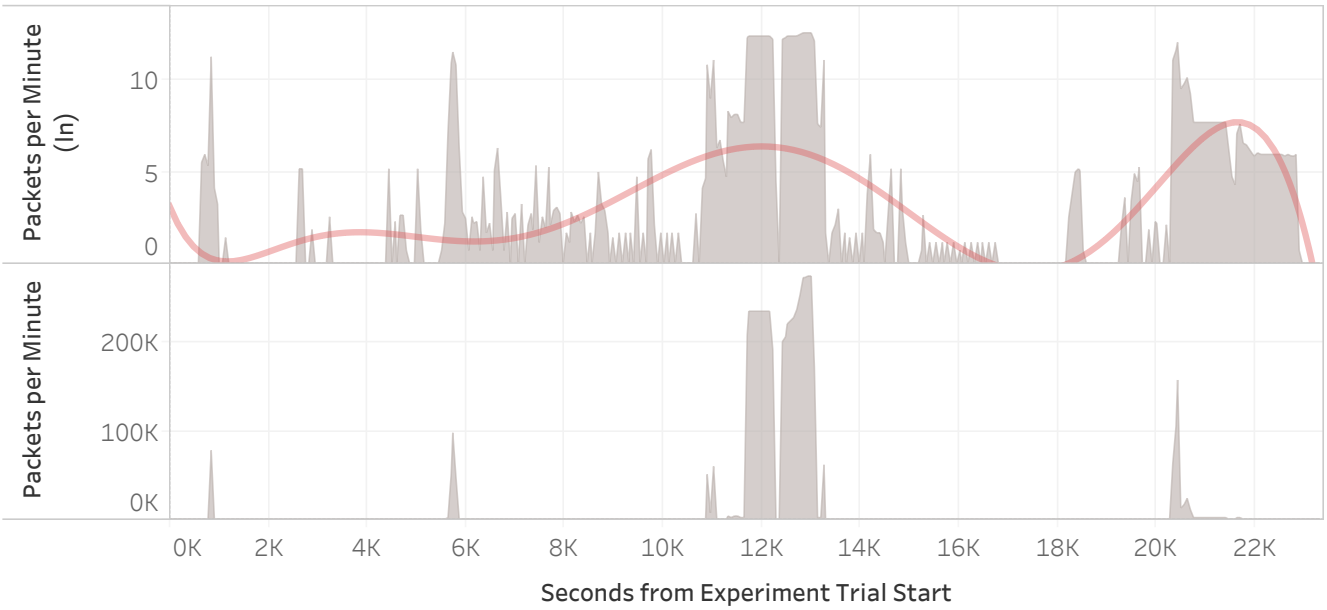
Real & Decoy System Interaction Timeline



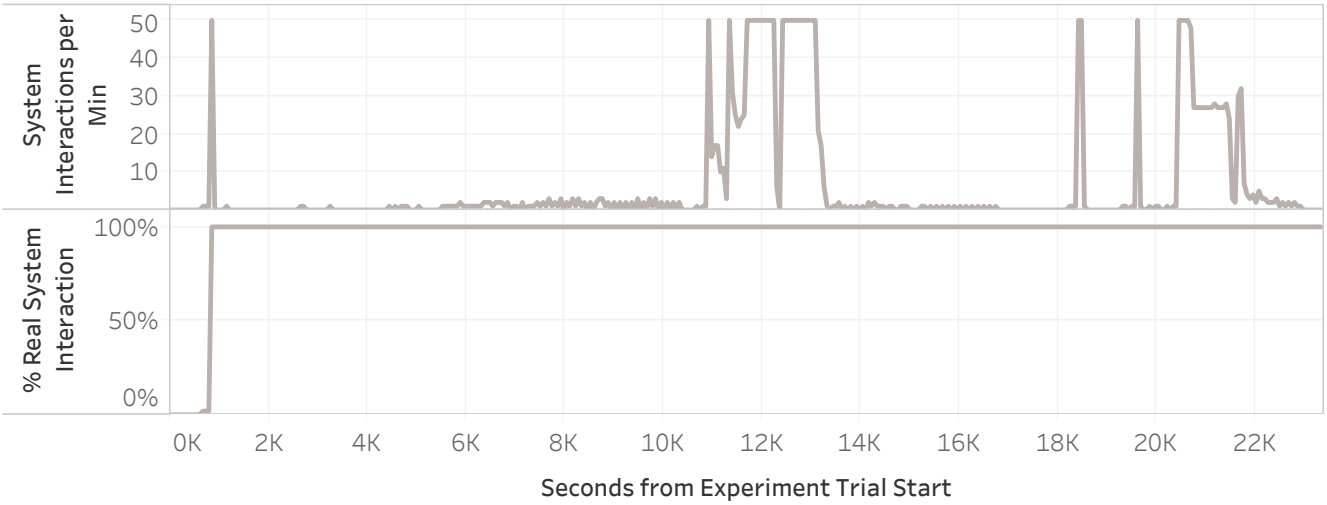

S112 - Day2 - AUPU - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
4
3
2
1
0
Real to Decoy Packet Ratio Time Average - 1.878
Overall Real to Decoy Ratio: 2.253
Running Sum of Packets
300K
250K
200K
150K
100K
50K
0K
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

S113 - Day 2 - PUAU

Real Packets per Minute



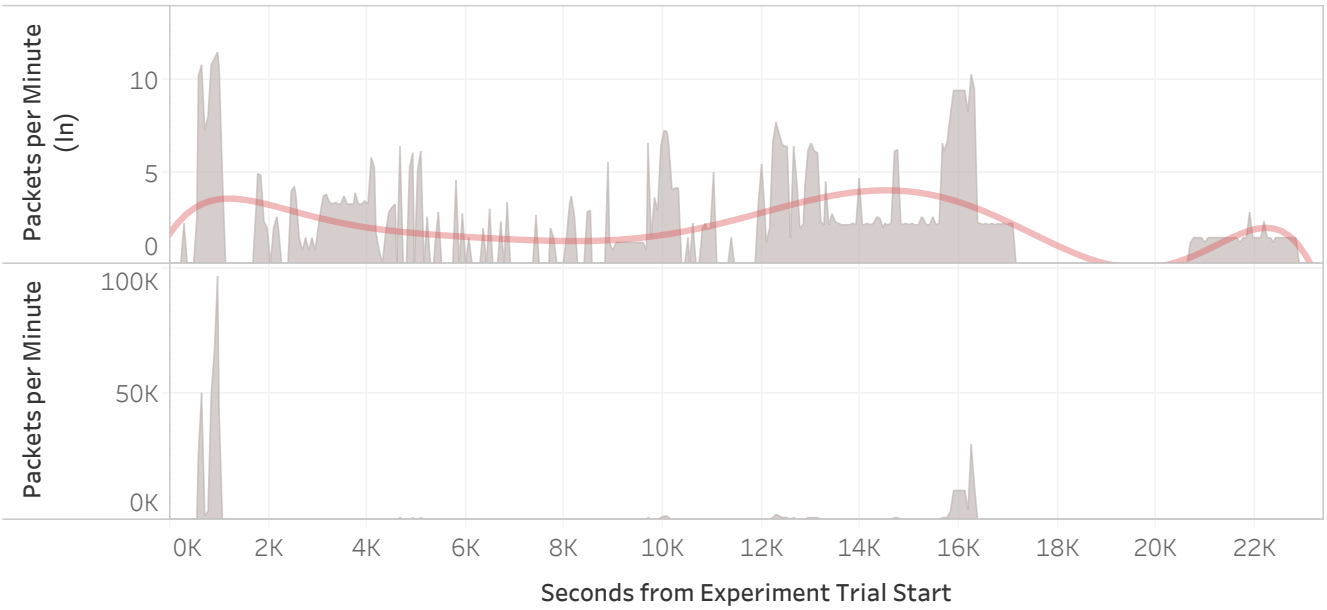
Real System Interaction Timeline



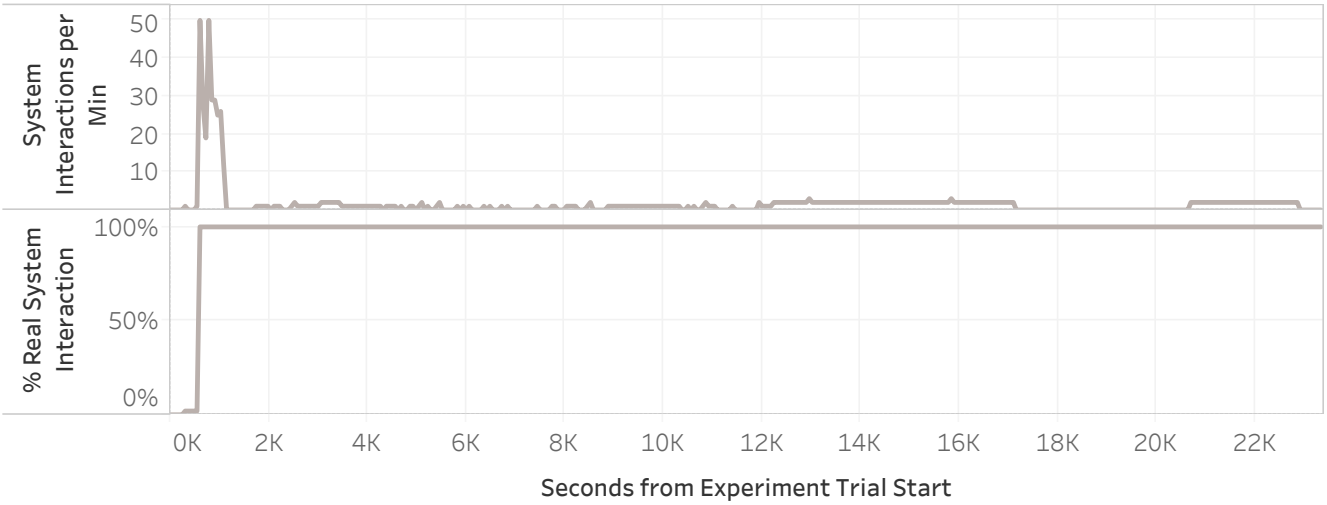
Running Sum of Packets

S114 - Day 2 - PUAU

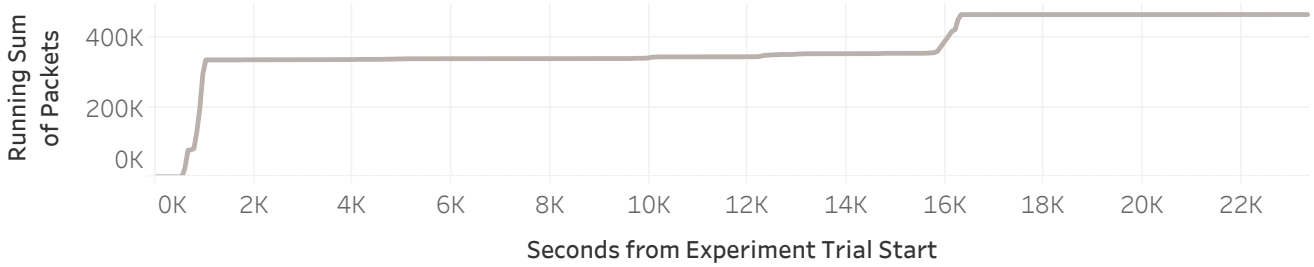
Real Packets per Minute



Real System Interaction Timeline

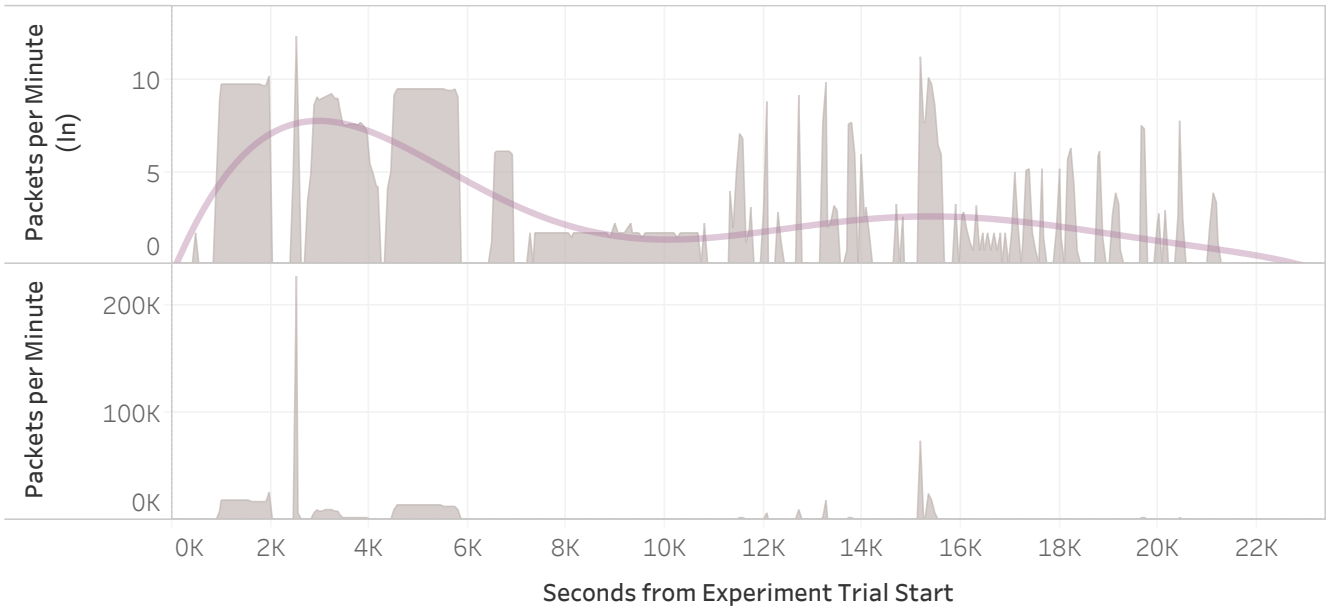


Running Sum of Packets

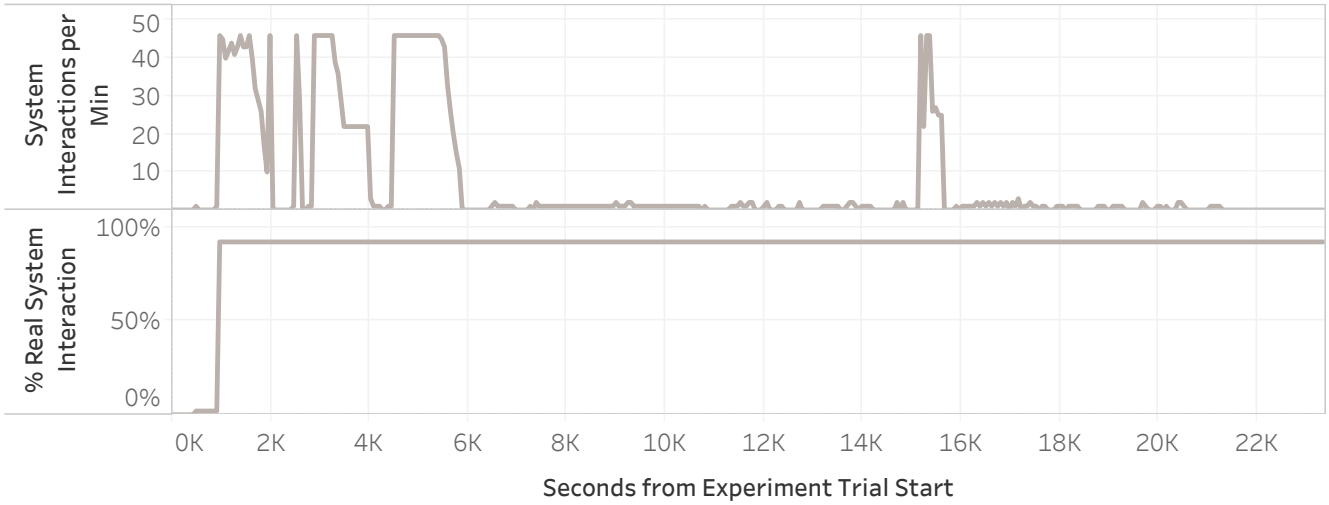


S115 - Day 2 - PIAU

Real Packets per Minute



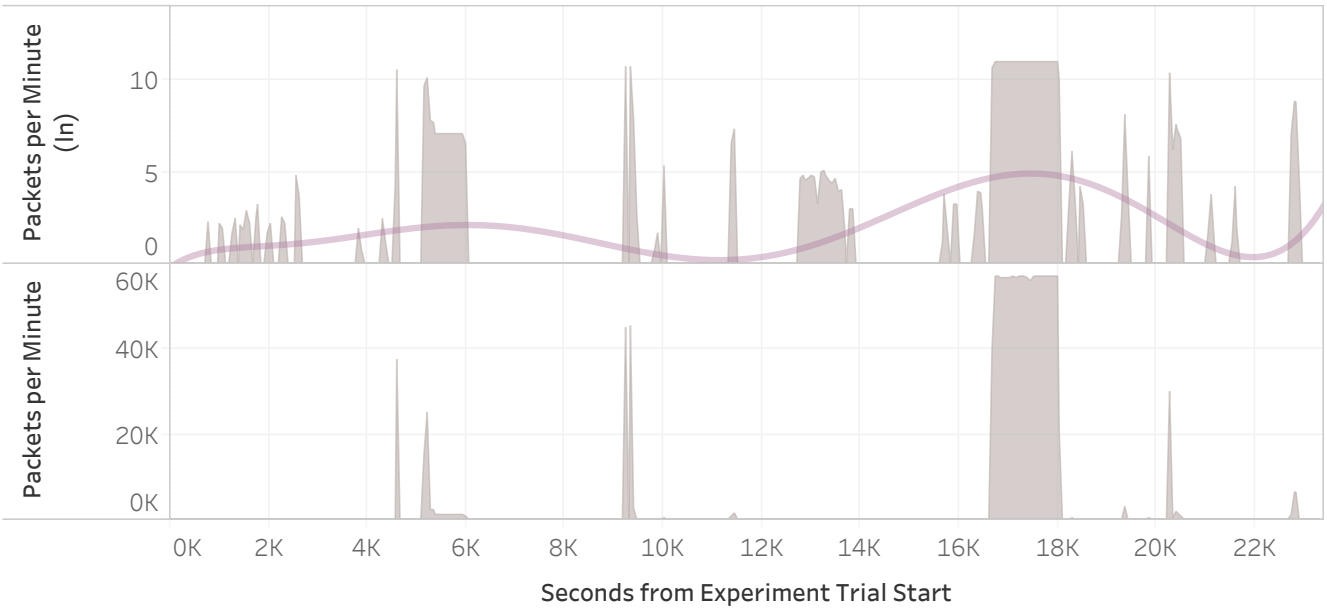
Real System Interaction Timeline



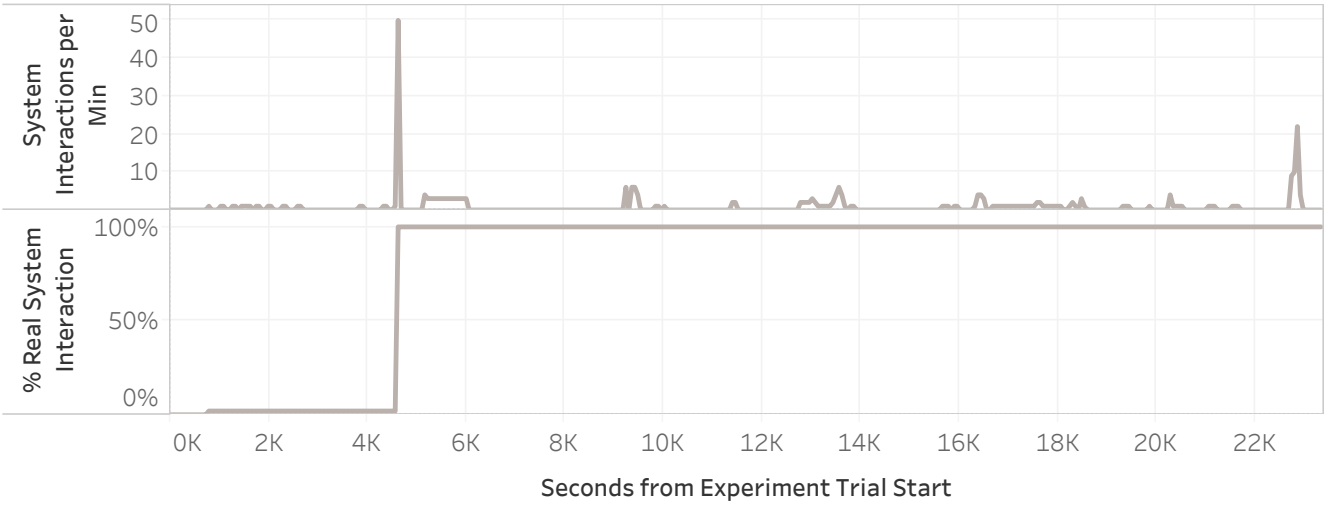
Running Sum of Packets

S116 - Day 2 - PIAU

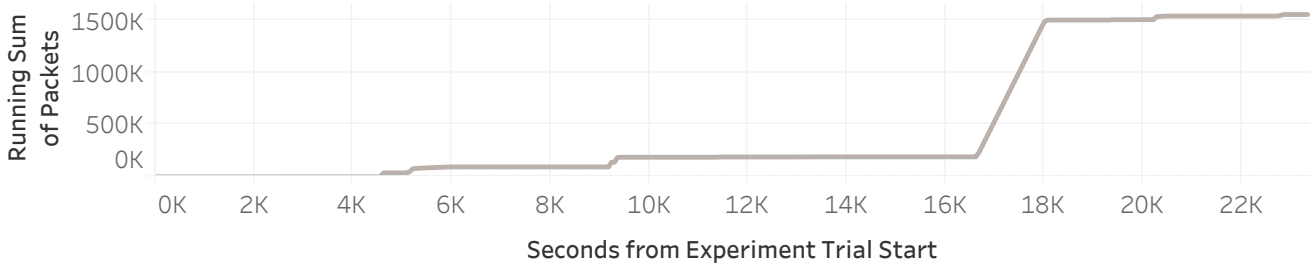
Real Packets per Minute



Real System Interaction Timeline

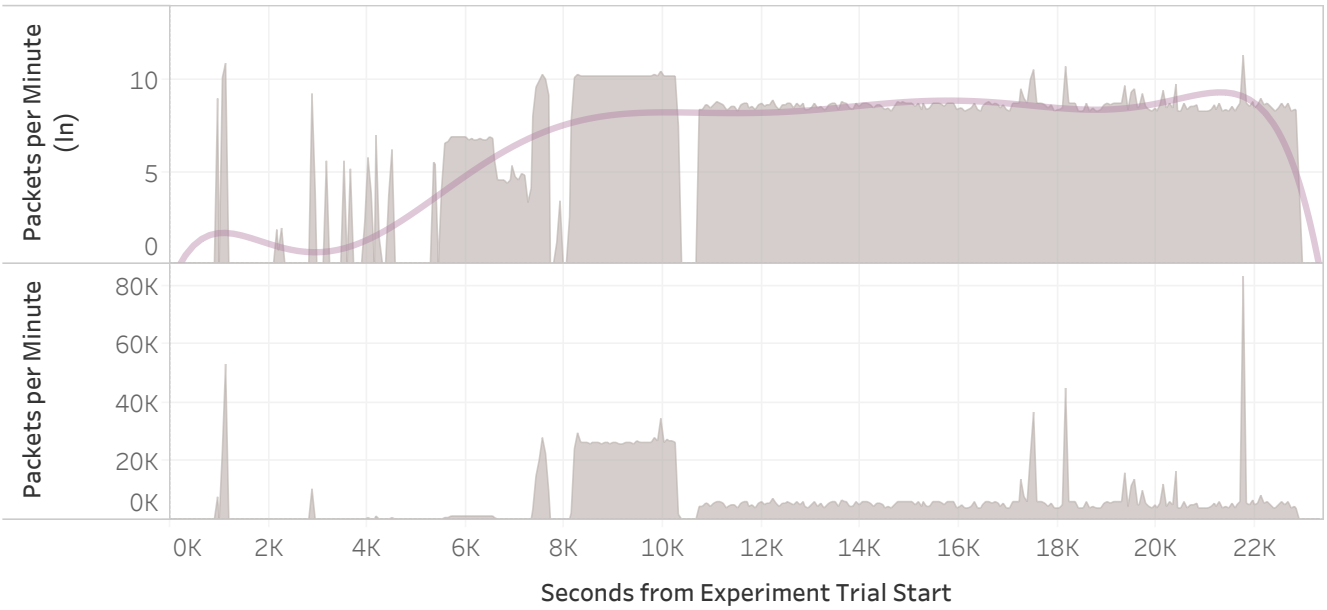


Running Sum of Packets

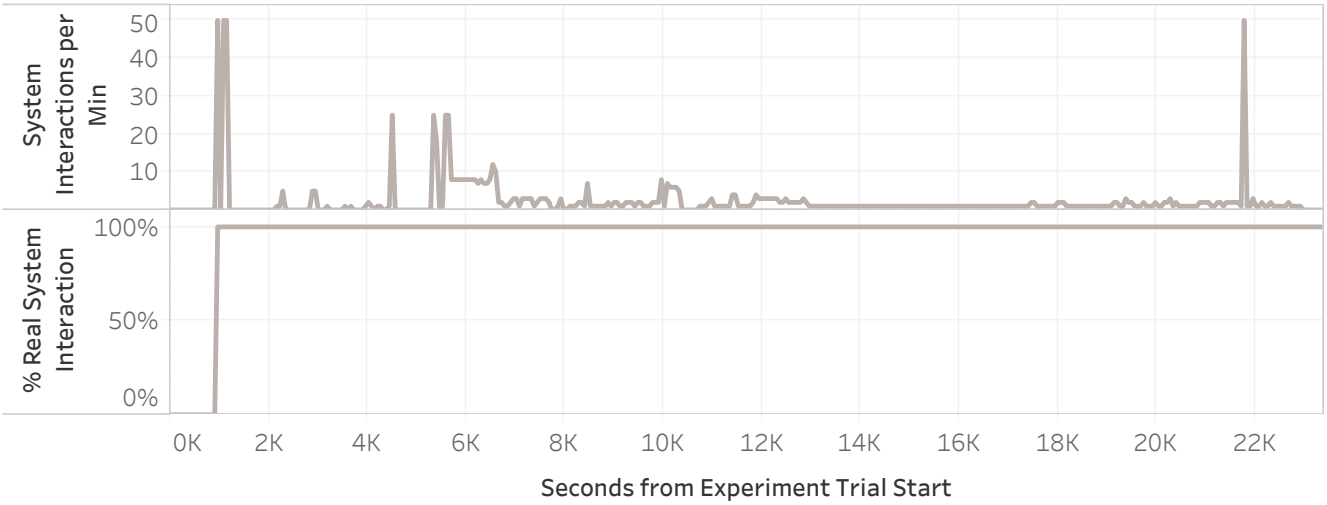


S117 - Day 2 - PIAU

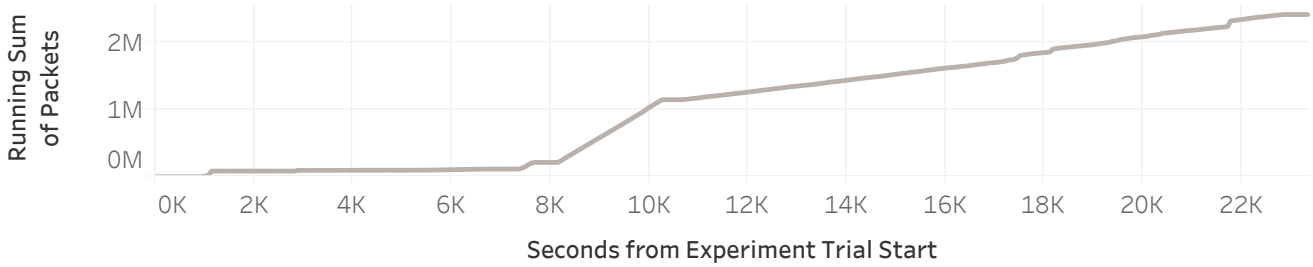
Real Packets per Minute



Real System Interaction Timeline

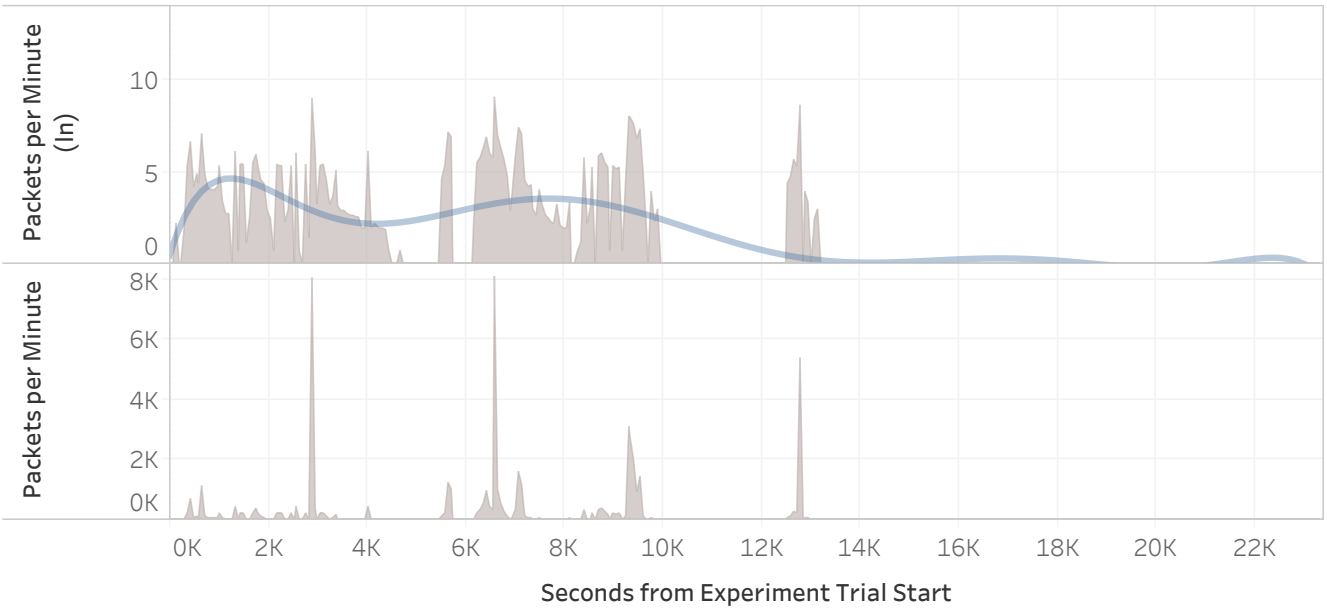


Running Sum of Packets

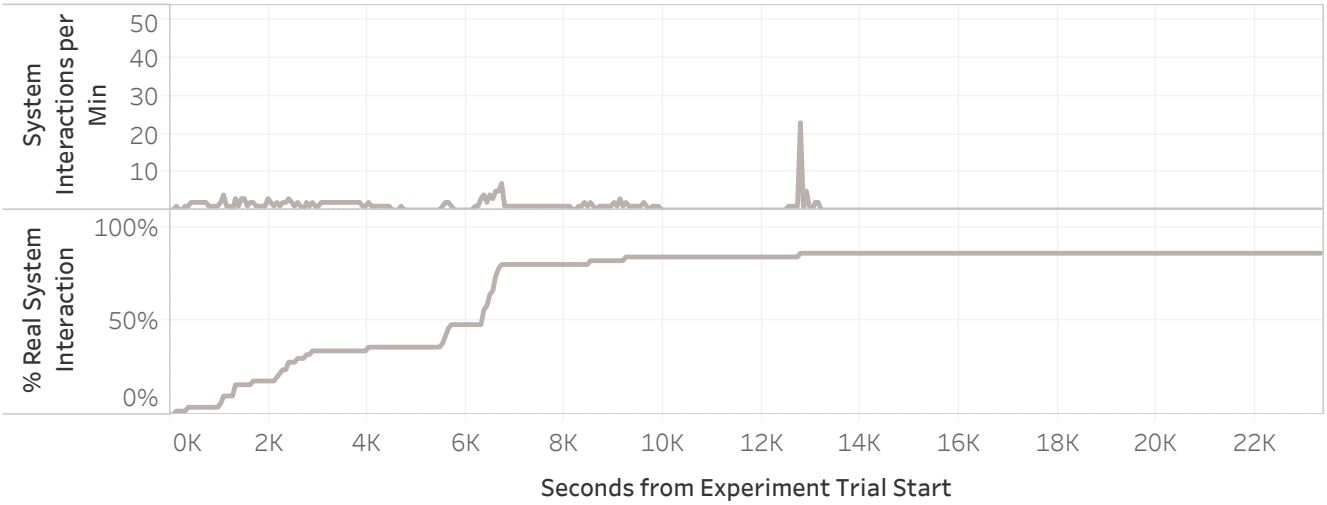


S118 - Day 2 - AIAU

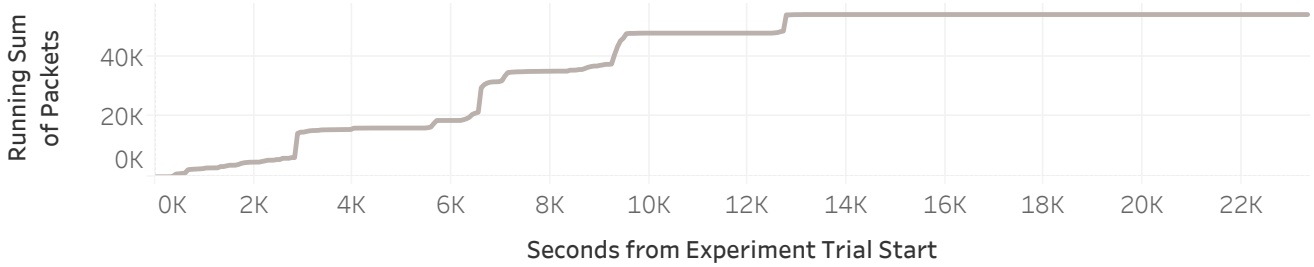
Real Packets per Minute



Real System Interaction Timeline

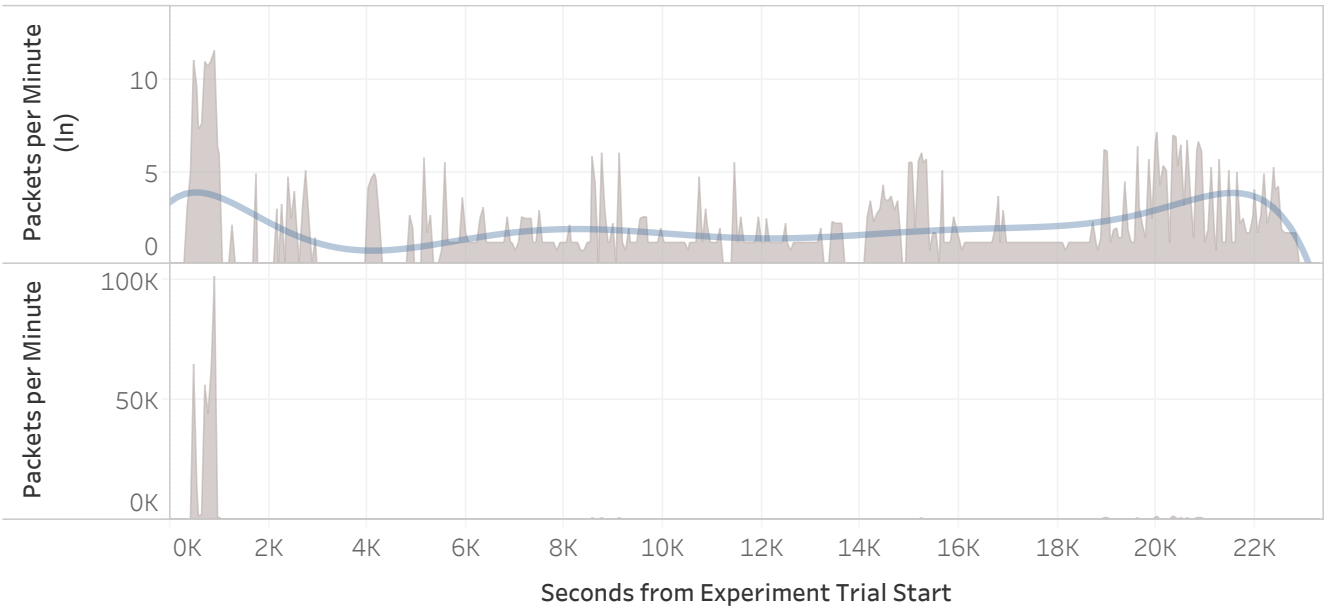


Running Sum of Packets

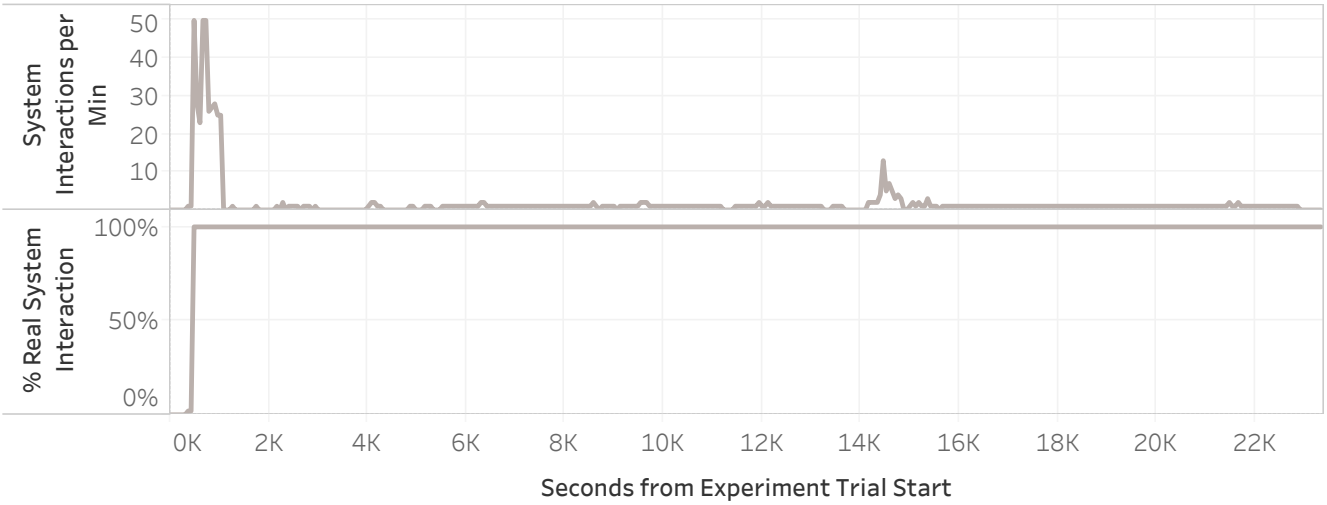


S119 - Day 2 - AIAU

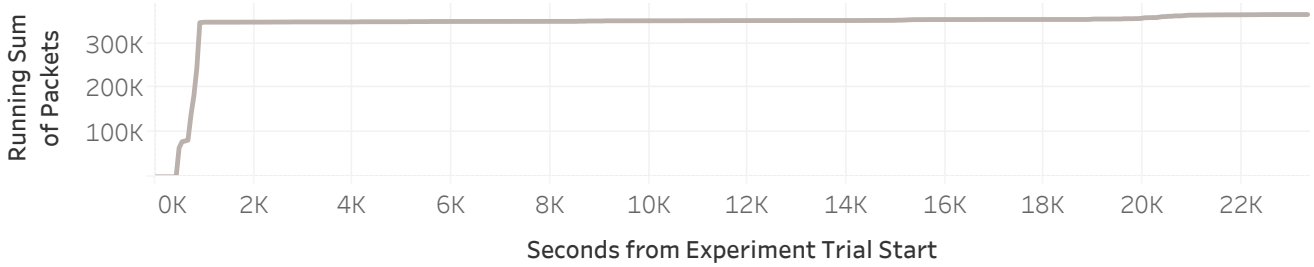
Real Packets per Minute



Real System Interaction Timeline



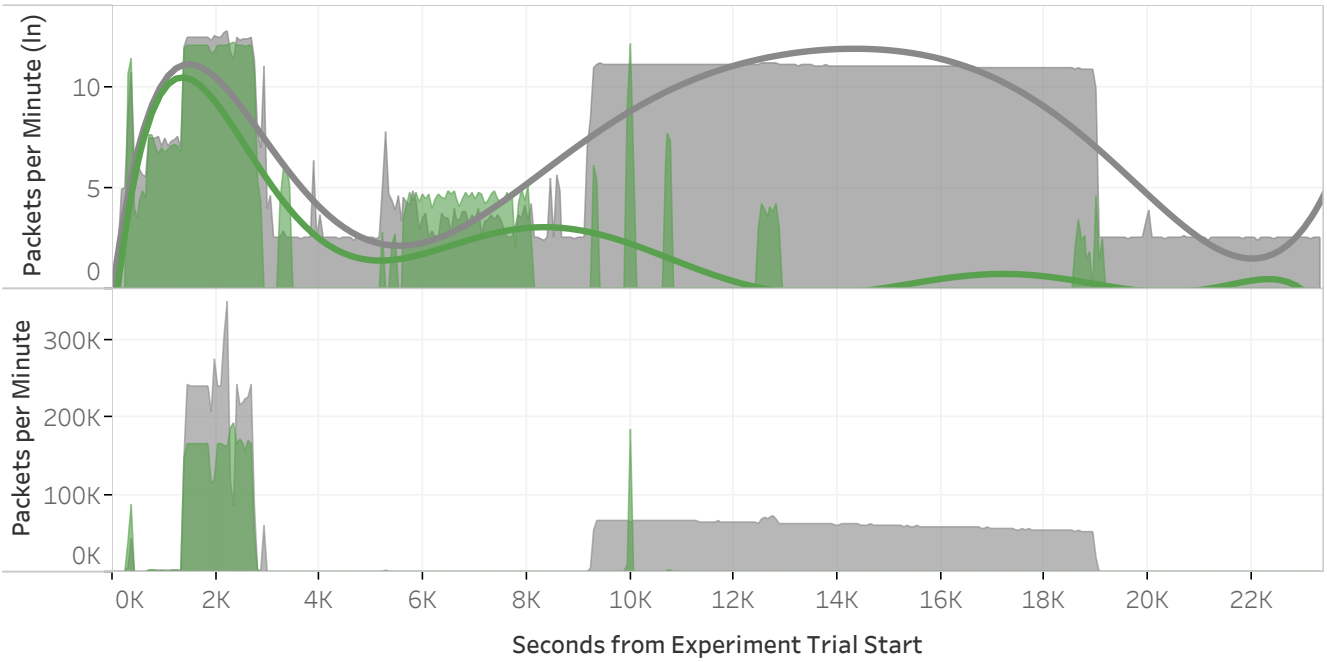
Running Sum of Packets



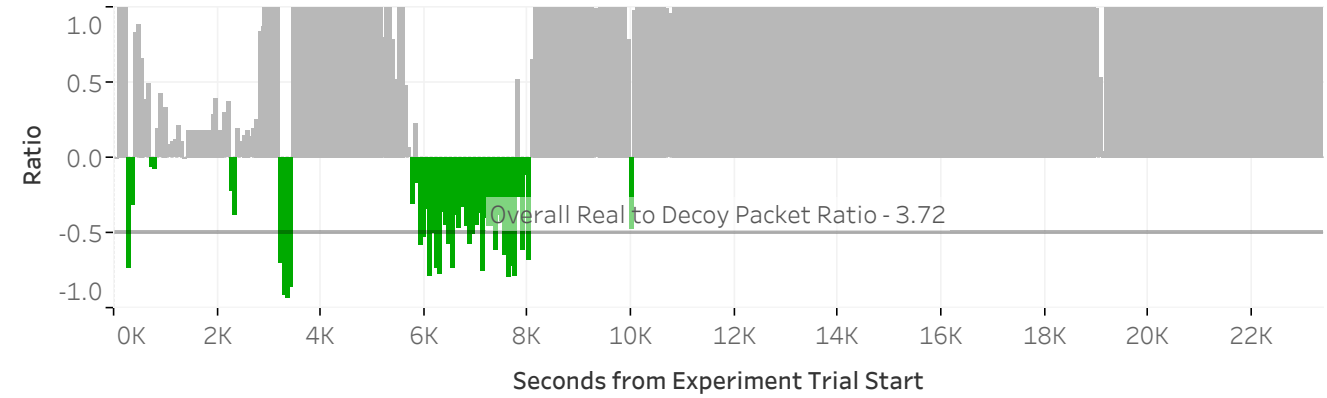
S120 - Day2 - AUPU

Legend
Real Systems
Decoy Systems

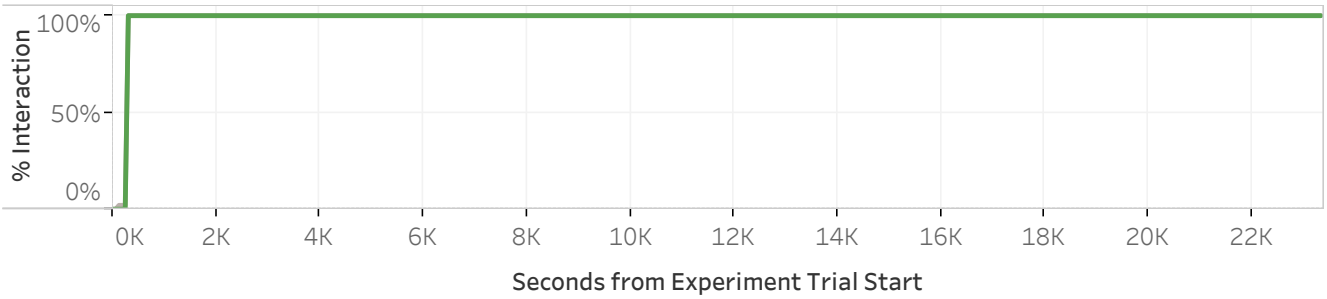
Real & Decoy Packets per Minute

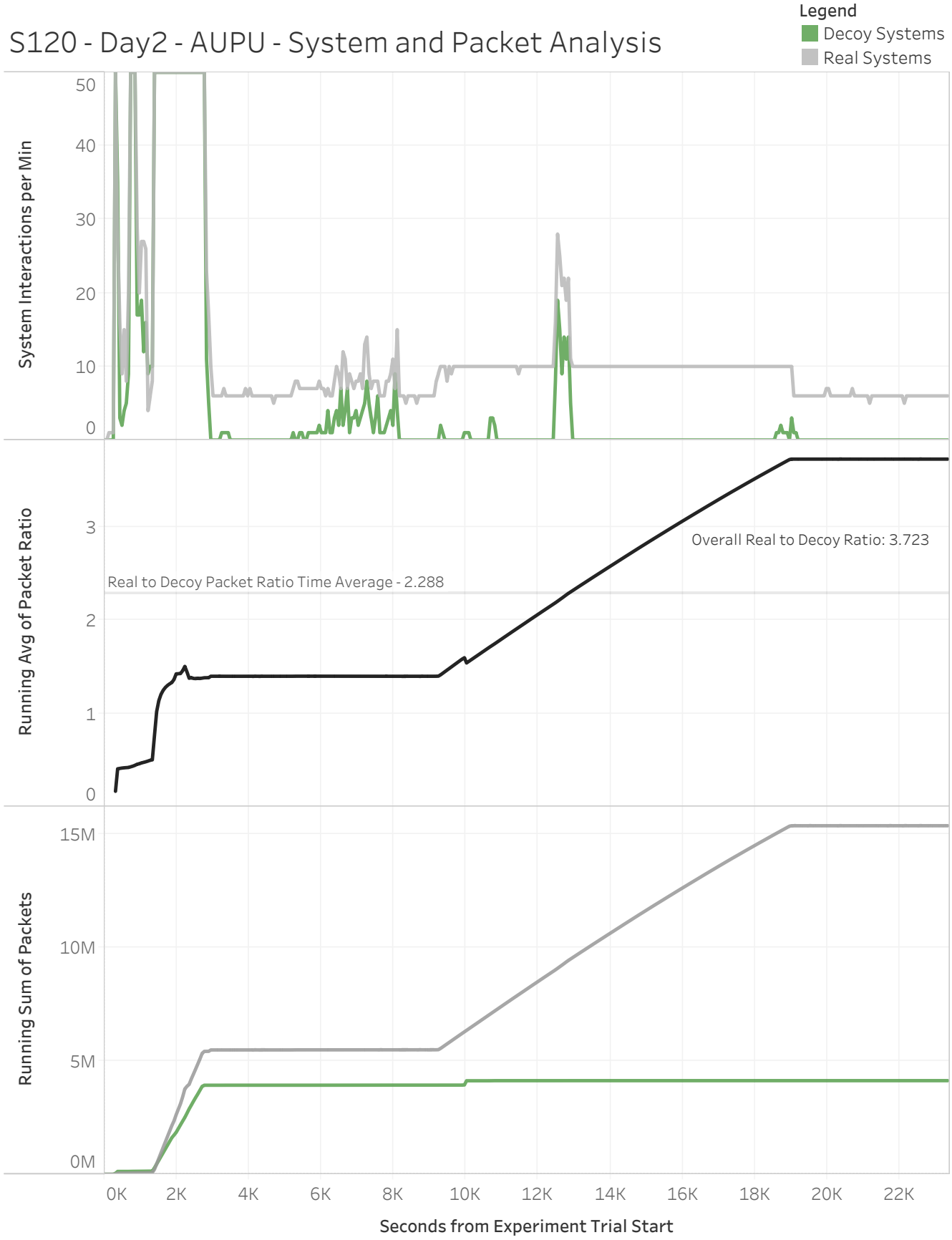


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

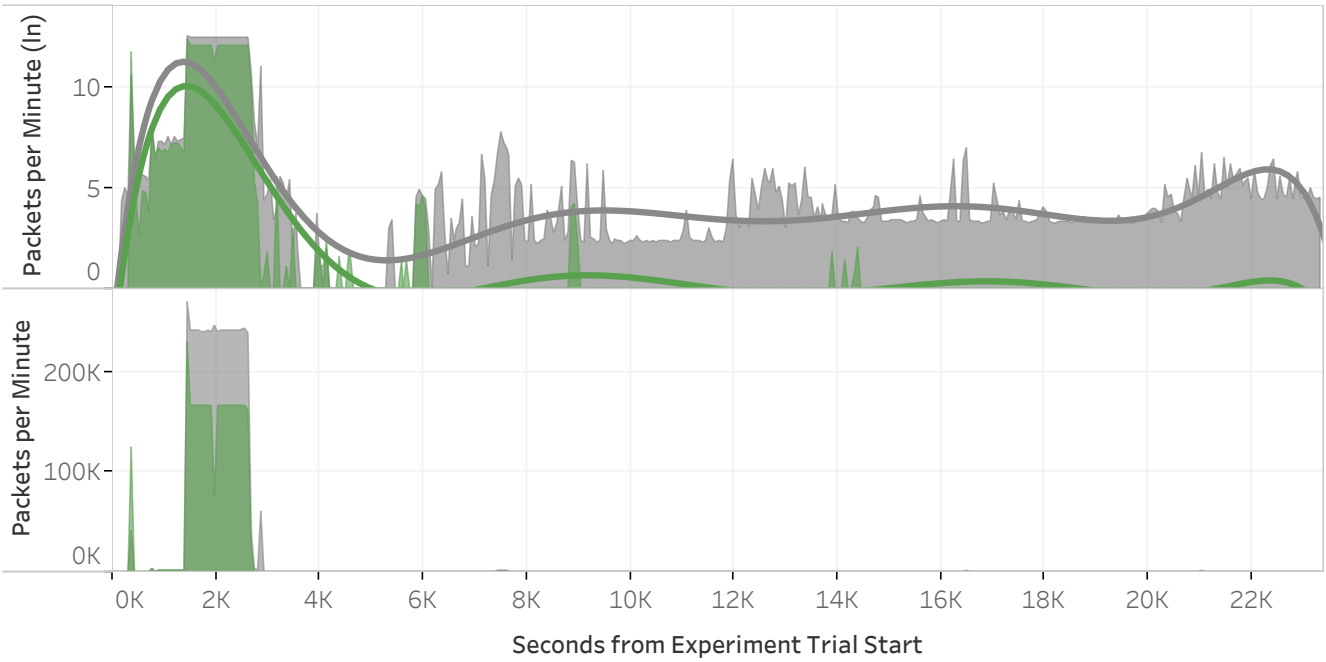



S120 - Day2 - AUPU - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
3
2
1
0
Real to Decoy Packet Ratio Time Average - 2.288
Overall Real to Decoy Ratio: 3.723
Running Sum of Packets
15M
10M
5M
0M
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

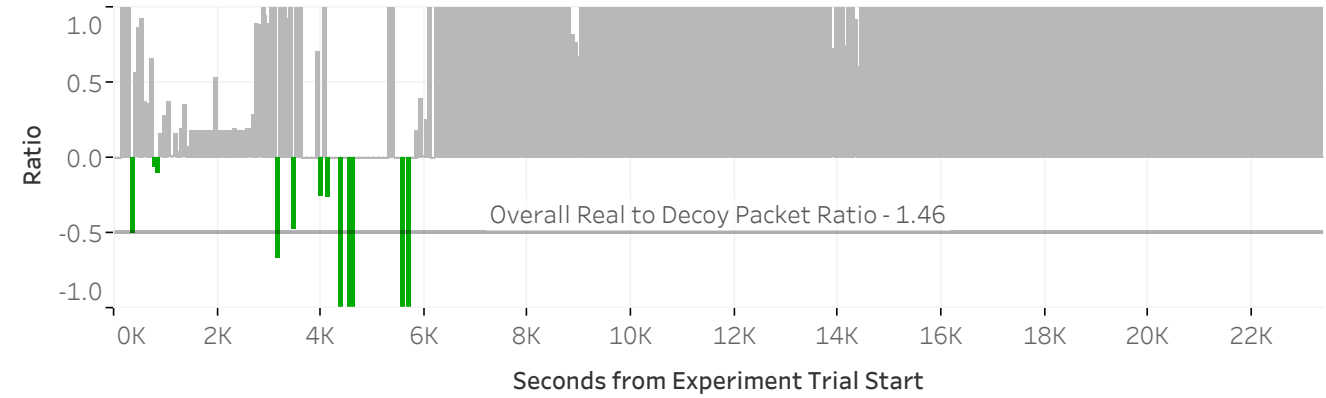
S121 - Day2 - AUPU

Legend
Real Systems
Decoy Systems

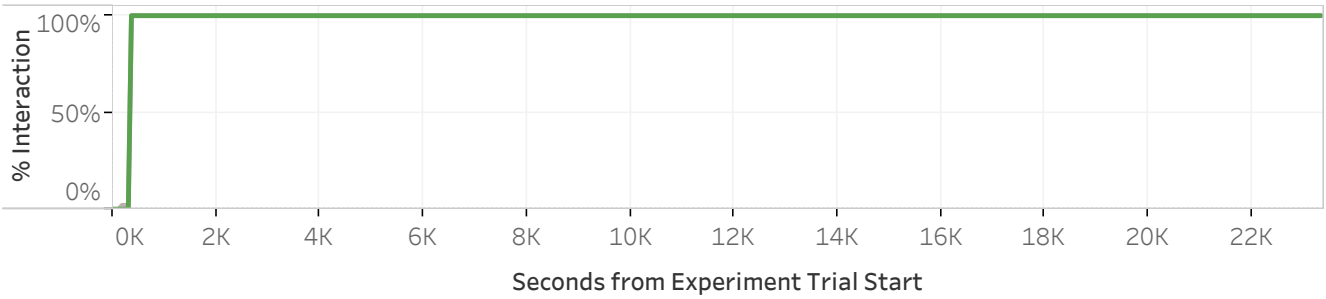
Real & Decoy Packets per Minute

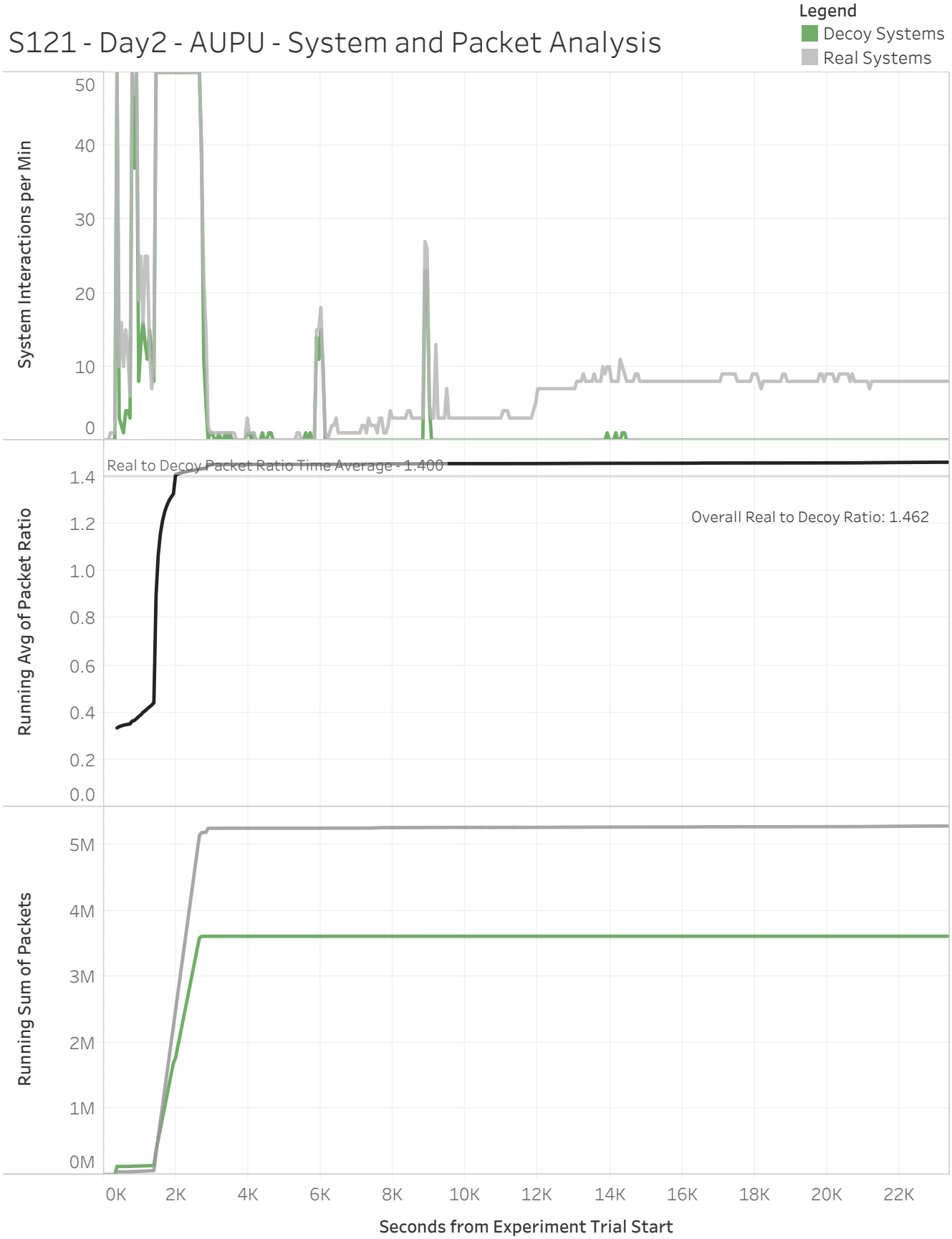


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

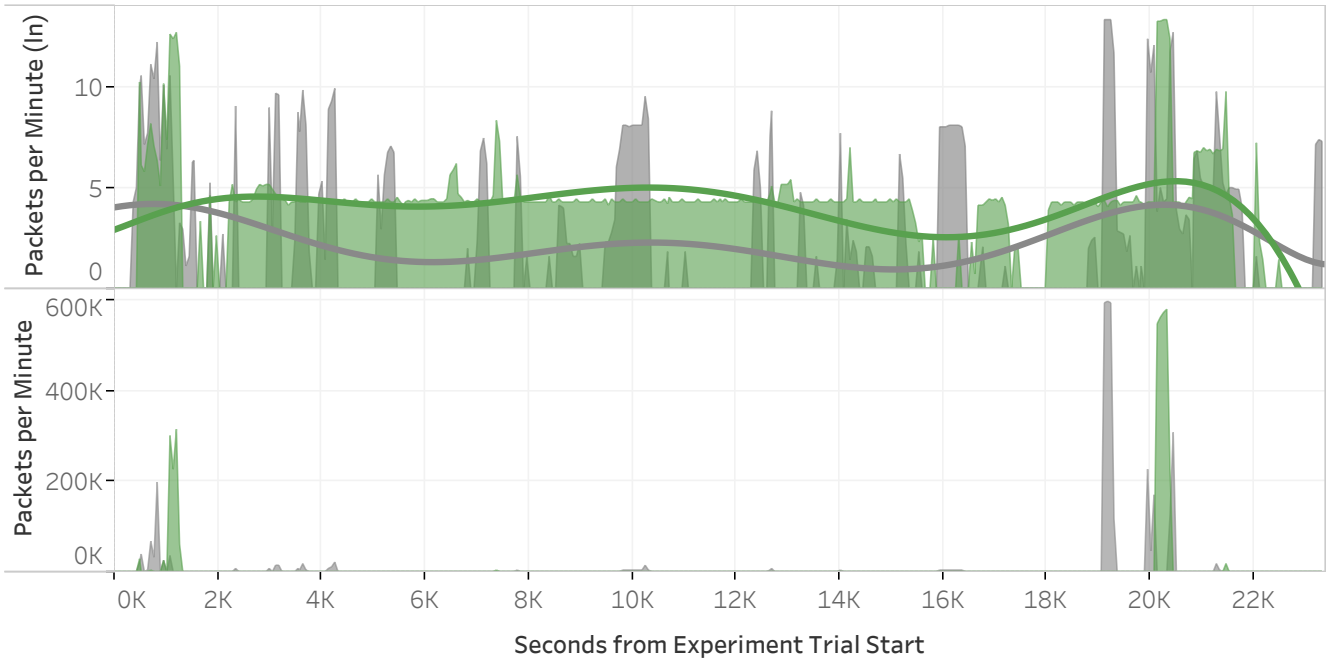



S121 - Day2 - AUPU - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Real to Decoy Packet Ratio Time Average - 1.400
Overall Real to Decoy Ratio: 1.462
Running Avg of Packet Ratio
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
Running Sum of Packets
5M
4M
3M
2M
1M
0M
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

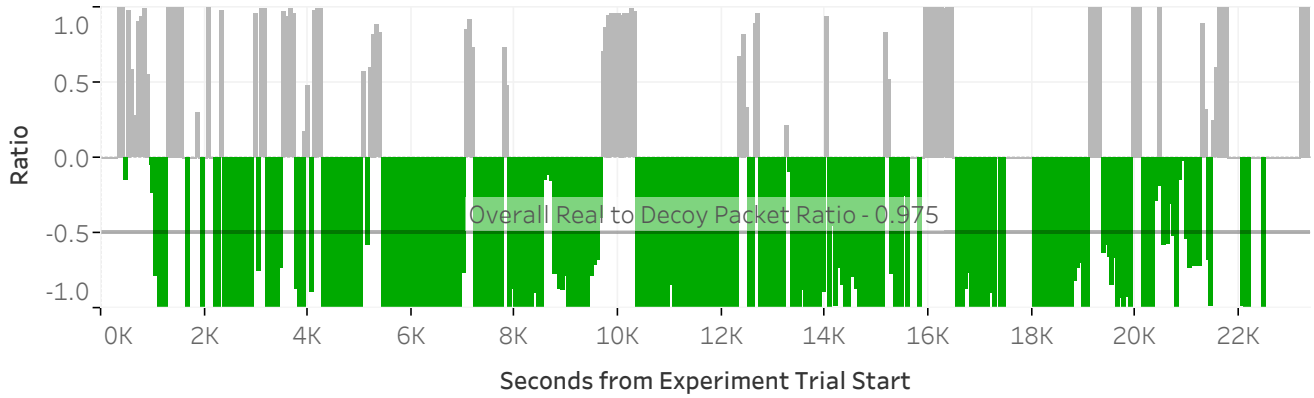
S122 - Day2 - AUPU

Legend
Real Systems
Decoy Systems

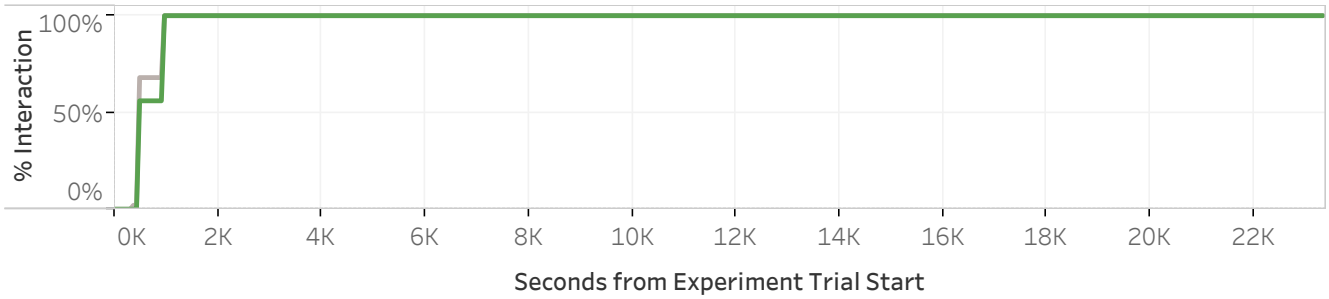
Real & Decoy Packets per Minute

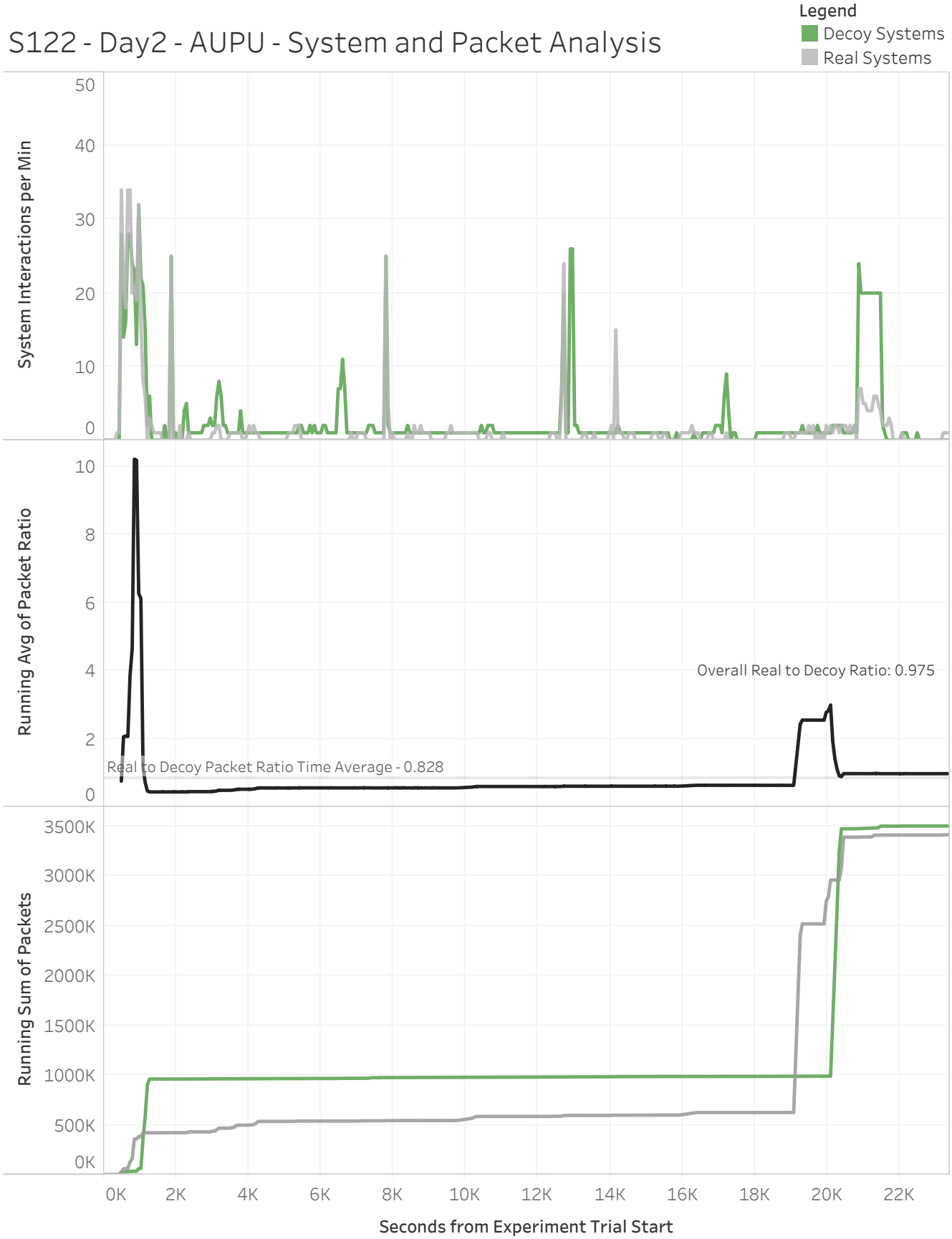


Real to Decoy Packet Ratio



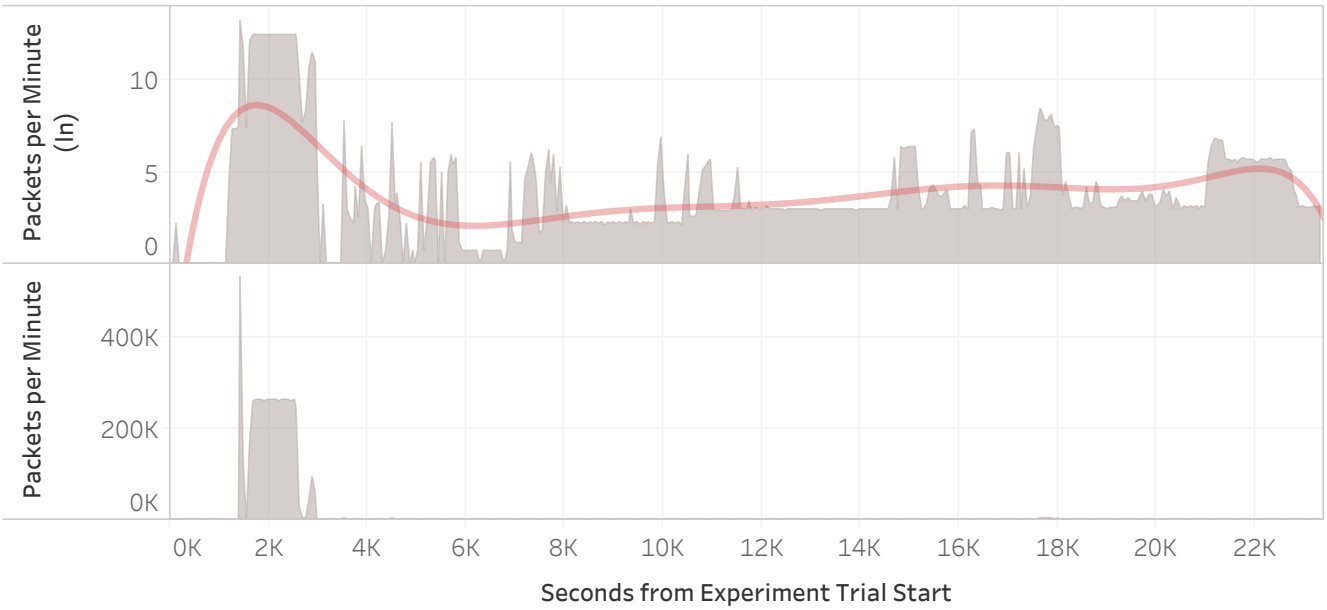
Real & Decoy System Interaction Timeline



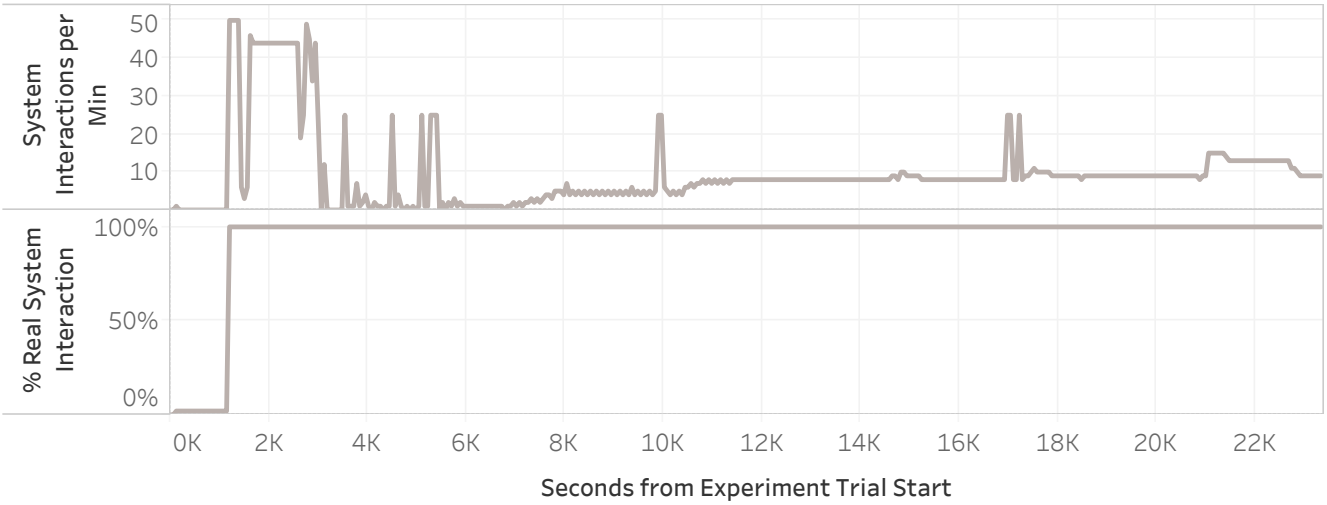

S122 - Day2 - AUPU - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
10
8
6
4
2
0
Overall Real to Decoy Ratio: 0.975
Real to Decoy Packet Ratio Time Average - 0.828
Running Sum of Packets
3500K
3000K
2500K
2000K
1500K
1000K
500K
0K
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

S123 - Day 2 - PUAU

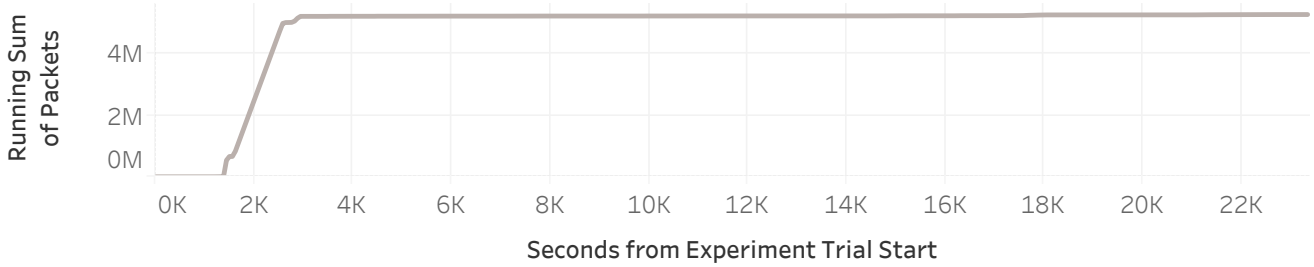
Real Packets per Minute



Real System Interaction Timeline

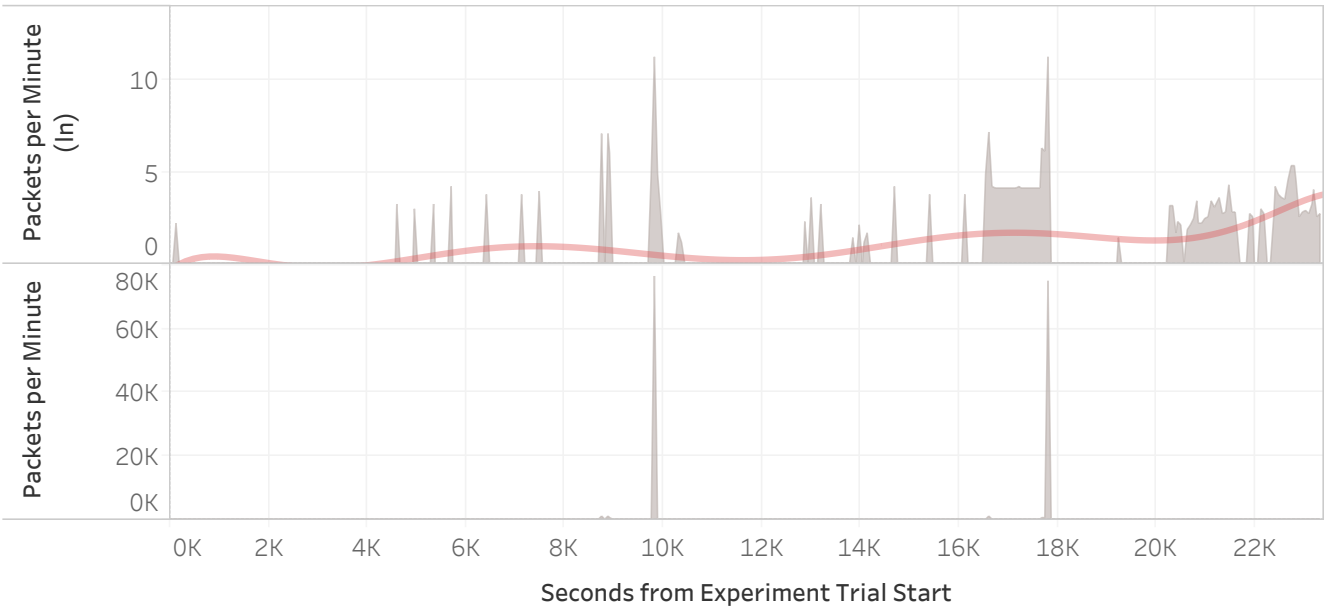


Running Sum of Packets

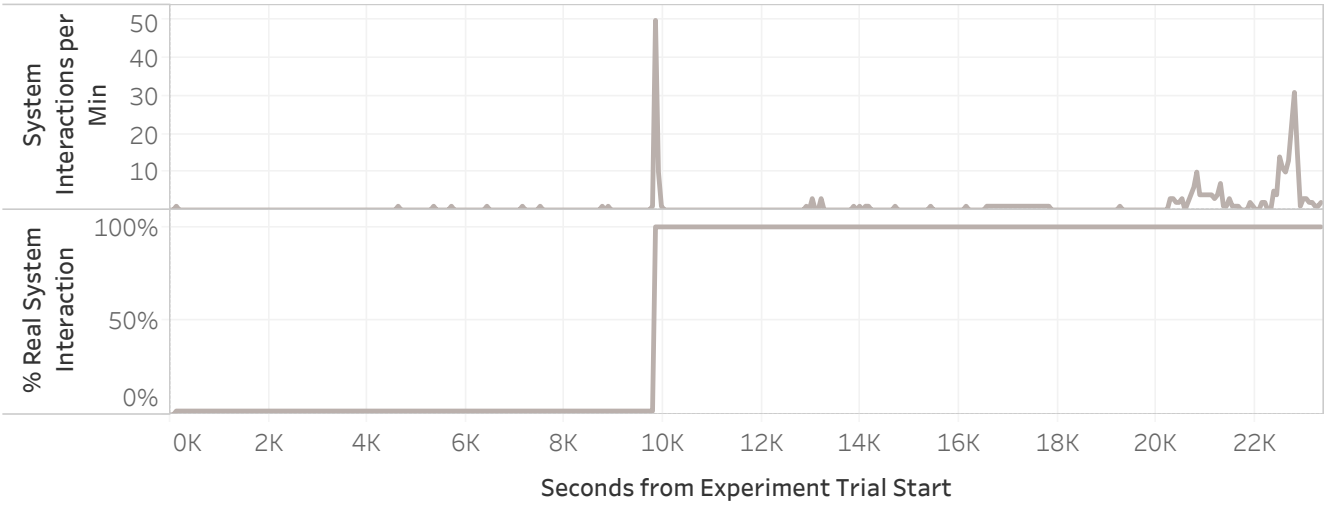


S124 - Day 2 - PUAU

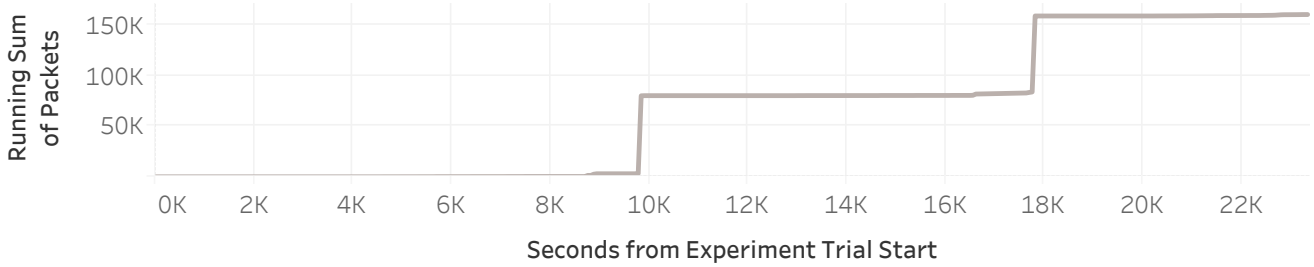
Real Packets per Minute



Real System Interaction Timeline

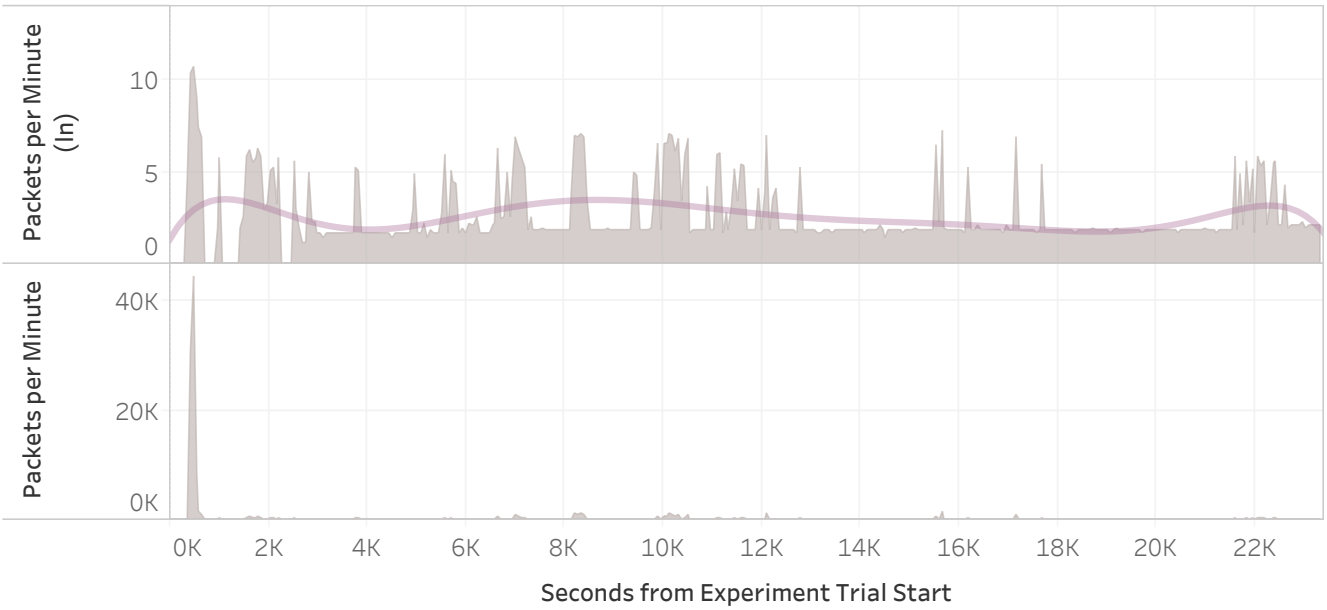


Running Sum of Packets

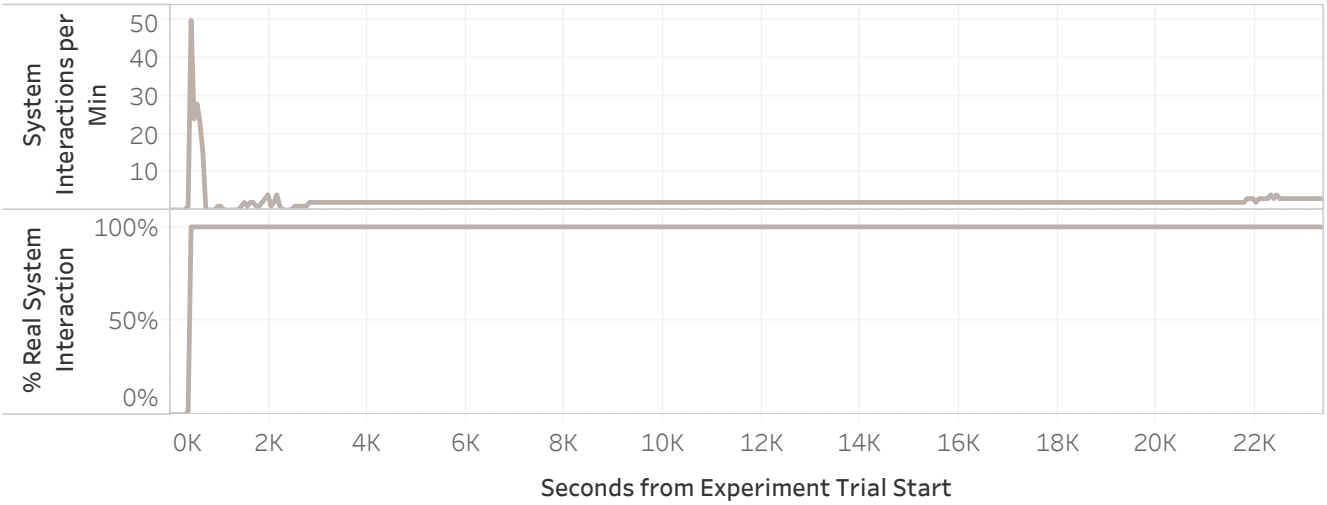


S125 - Day 2 - PIAU

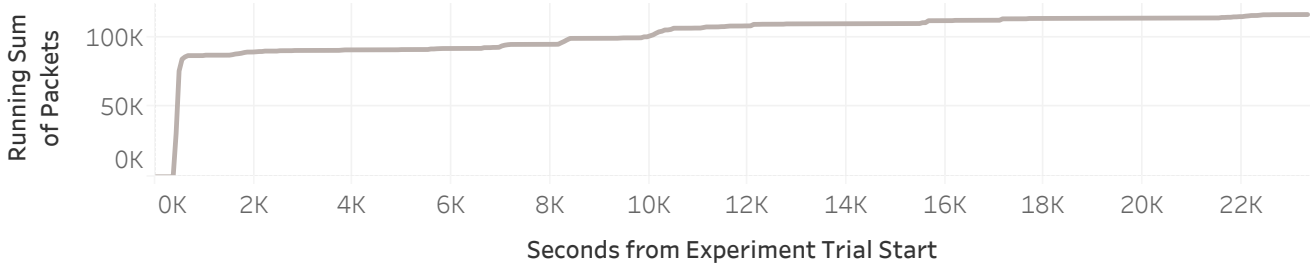
Real Packets per Minute



Real System Interaction Timeline

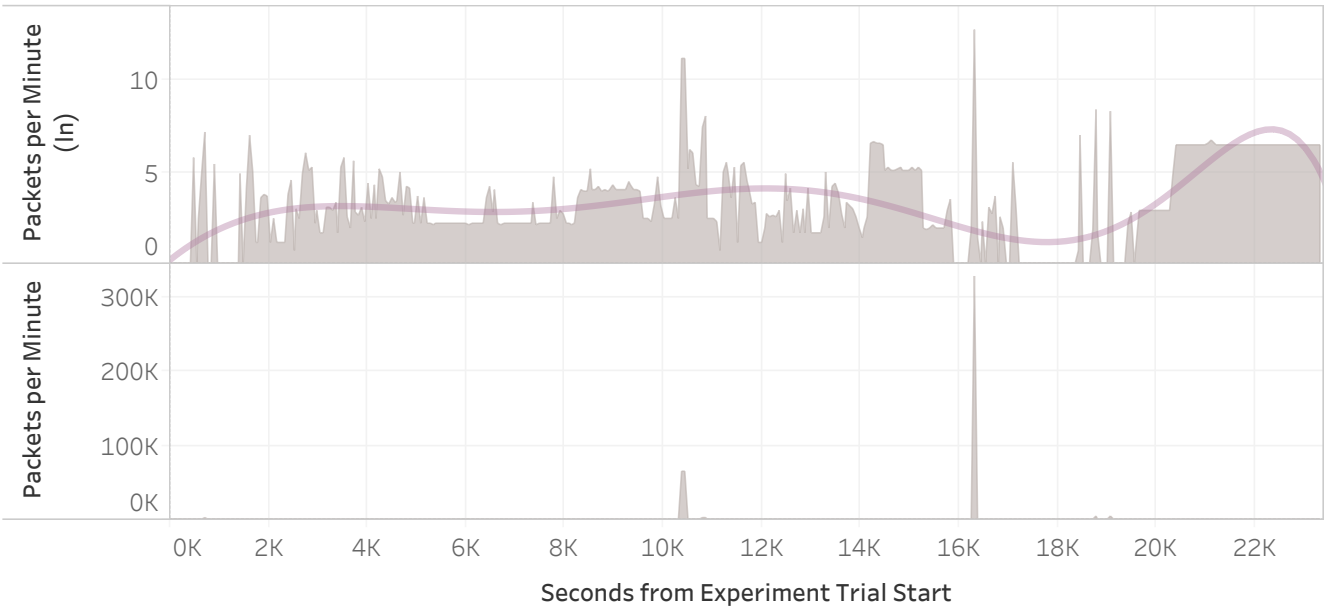


Running Sum of Packets

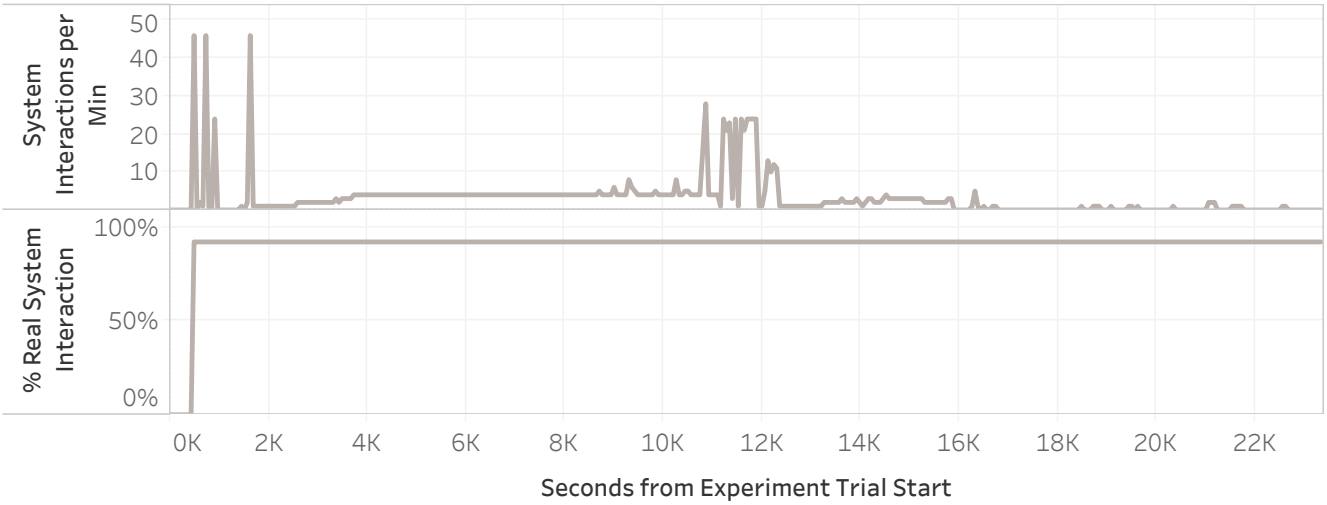


S126 - Day 2 - PIAU

Real Packets per Minute



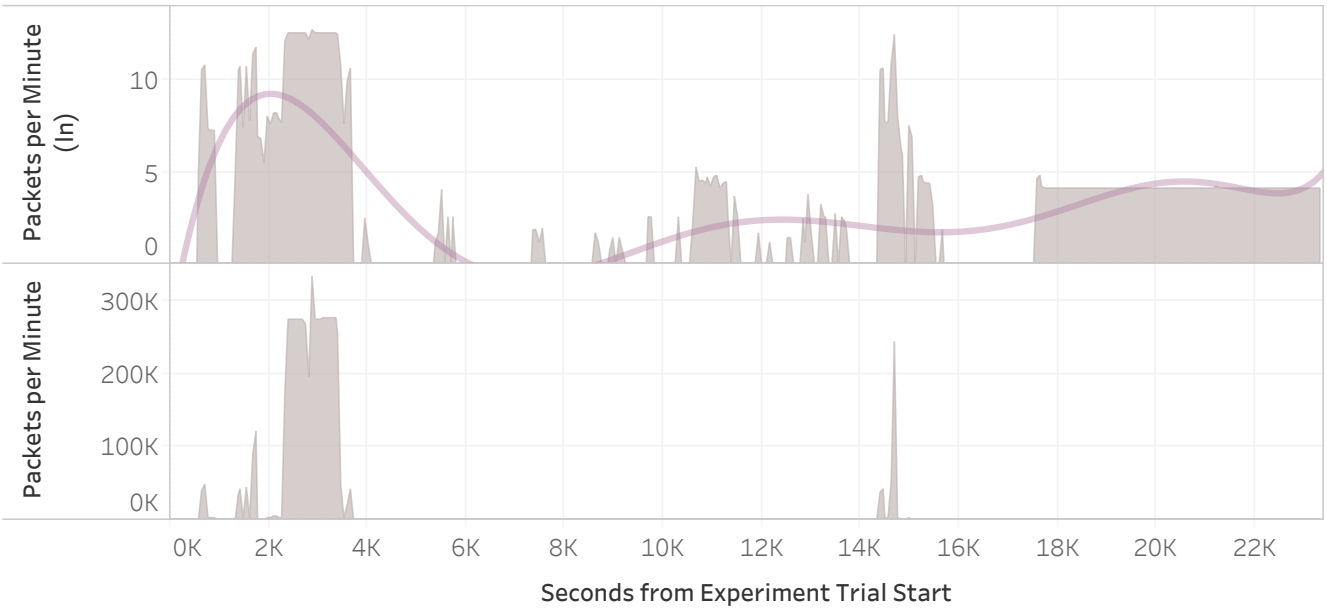
Real System Interaction Timeline



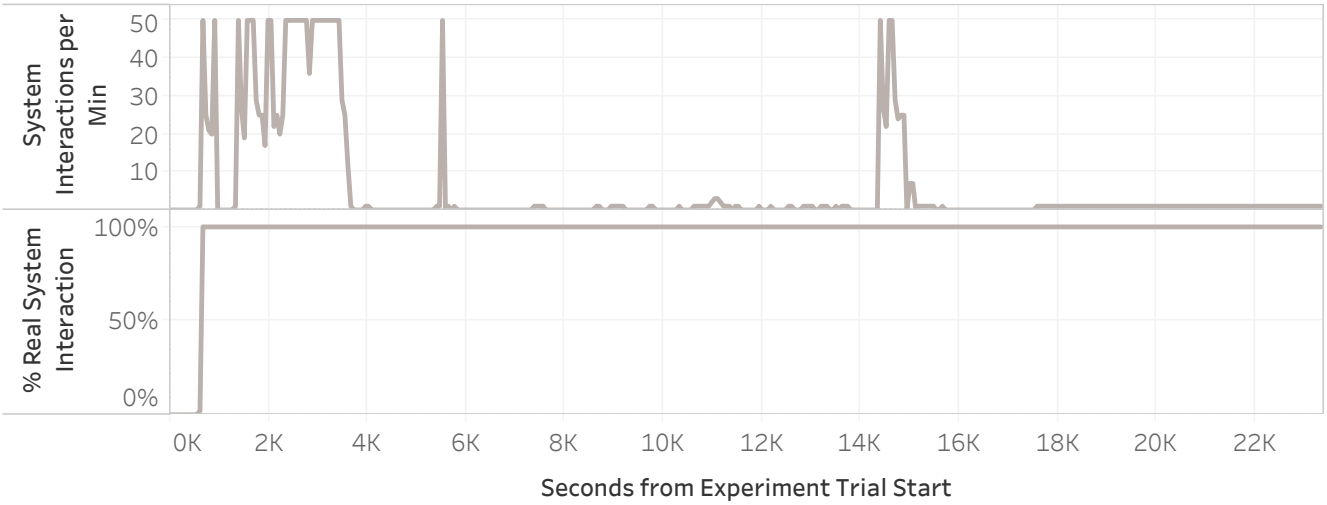
Running Sum of Packets

S127 - Day 2 - PIAU

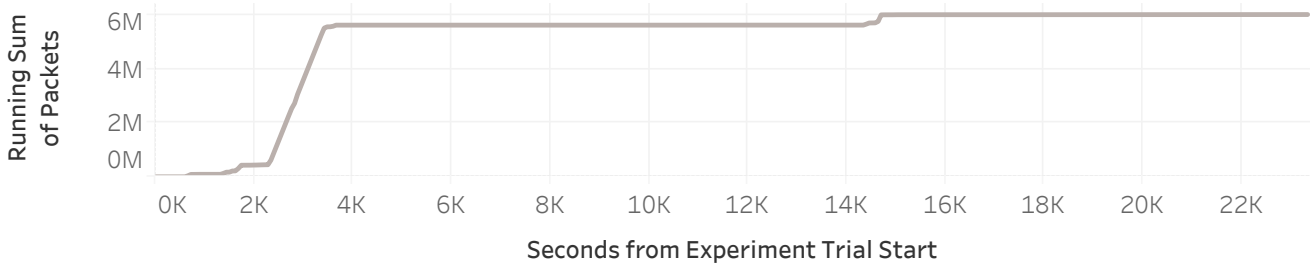
Real Packets per Minute



Real System Interaction Timeline

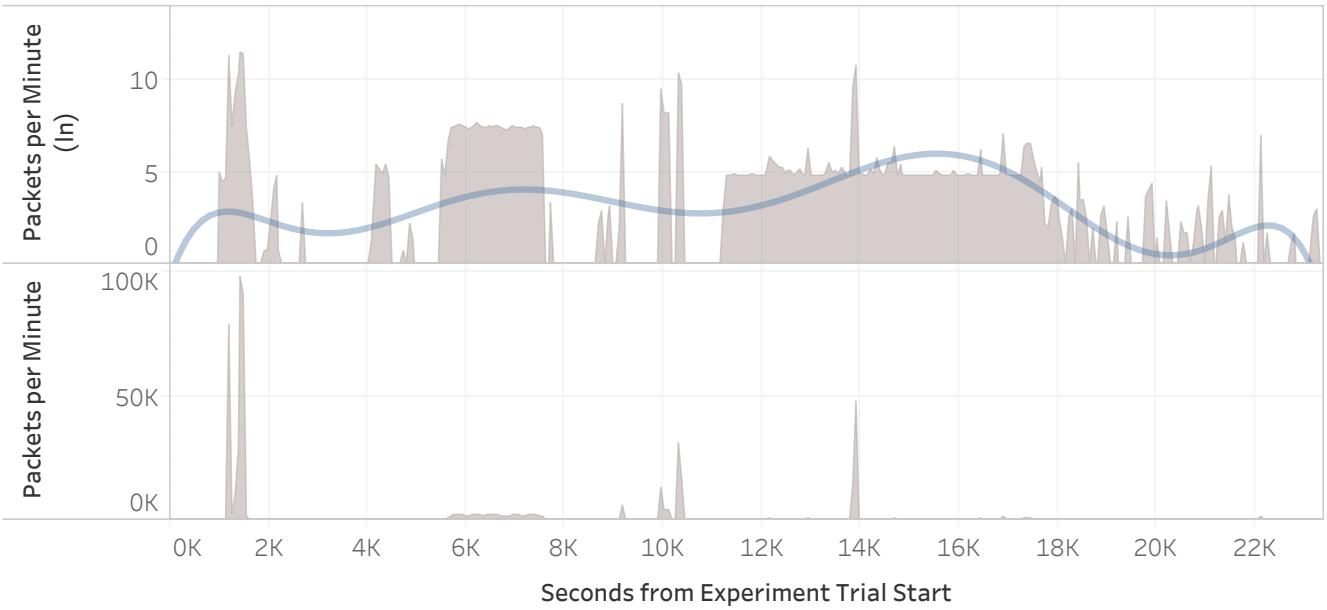


Running Sum of Packets

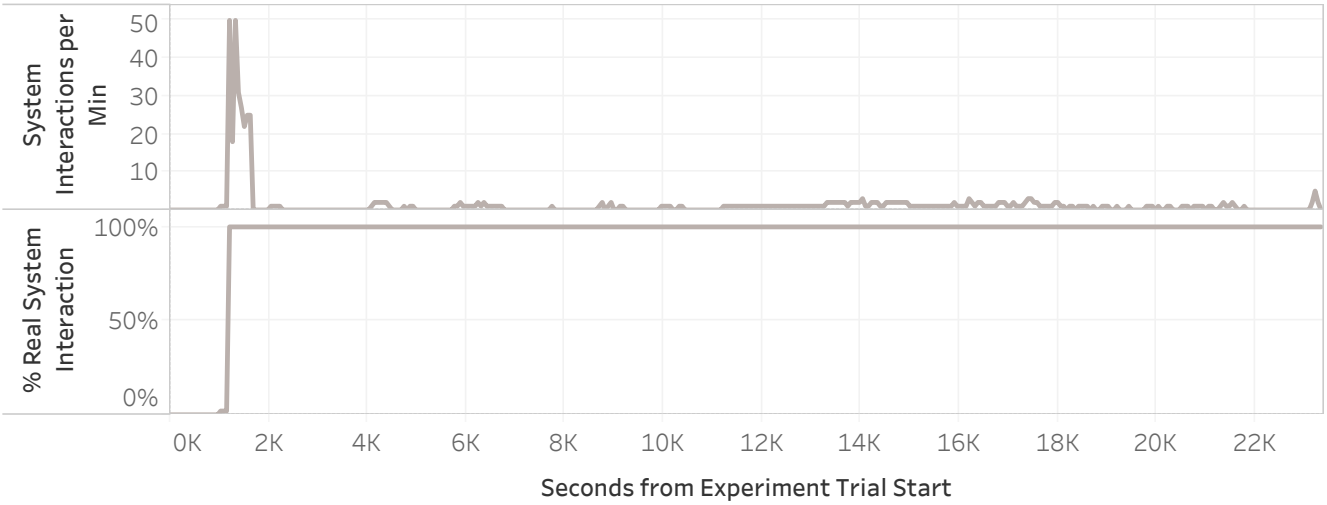


S128 - Day 2 - AIAU

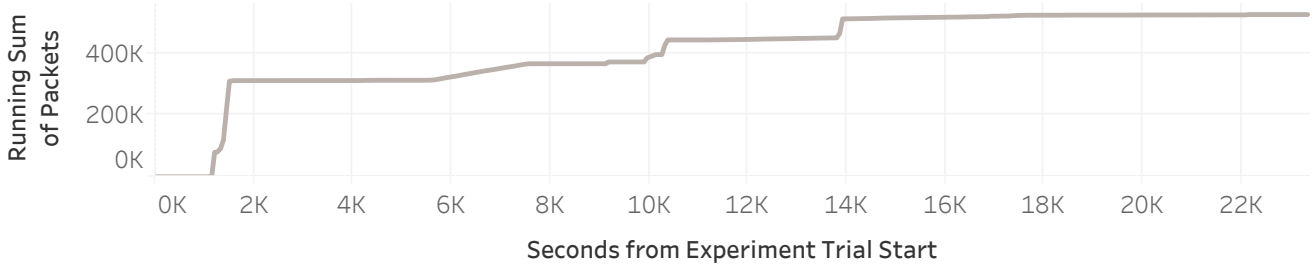
Real Packets per Minute



Real System Interaction Timeline

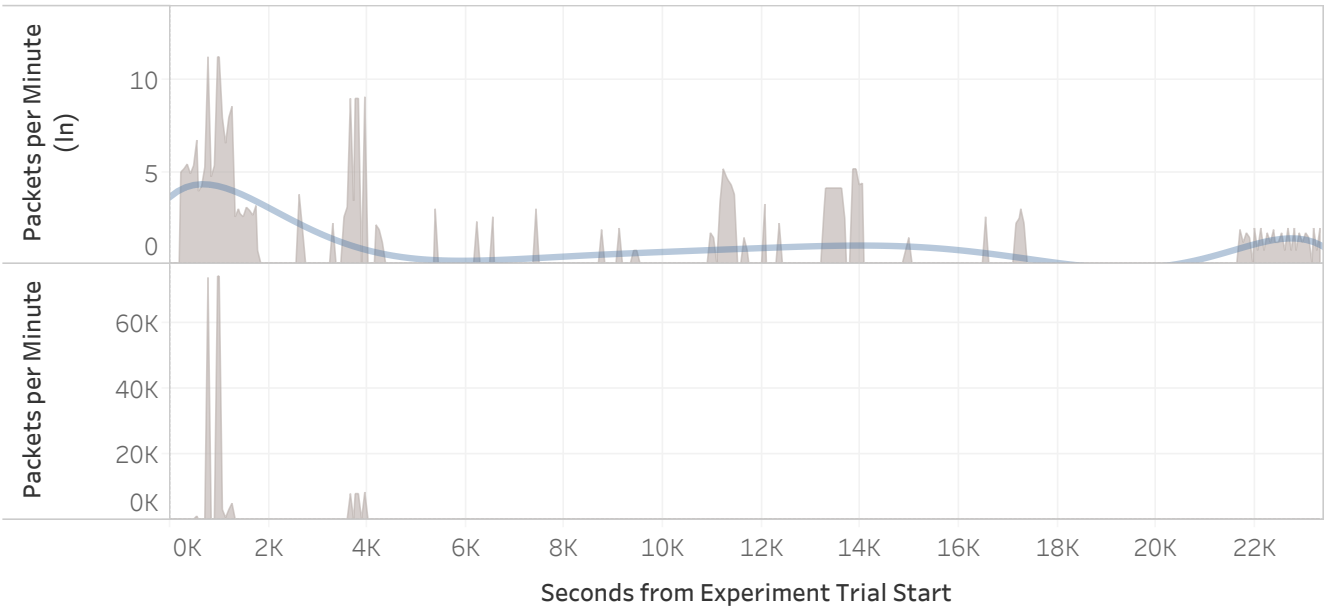


Running Sum of Packets

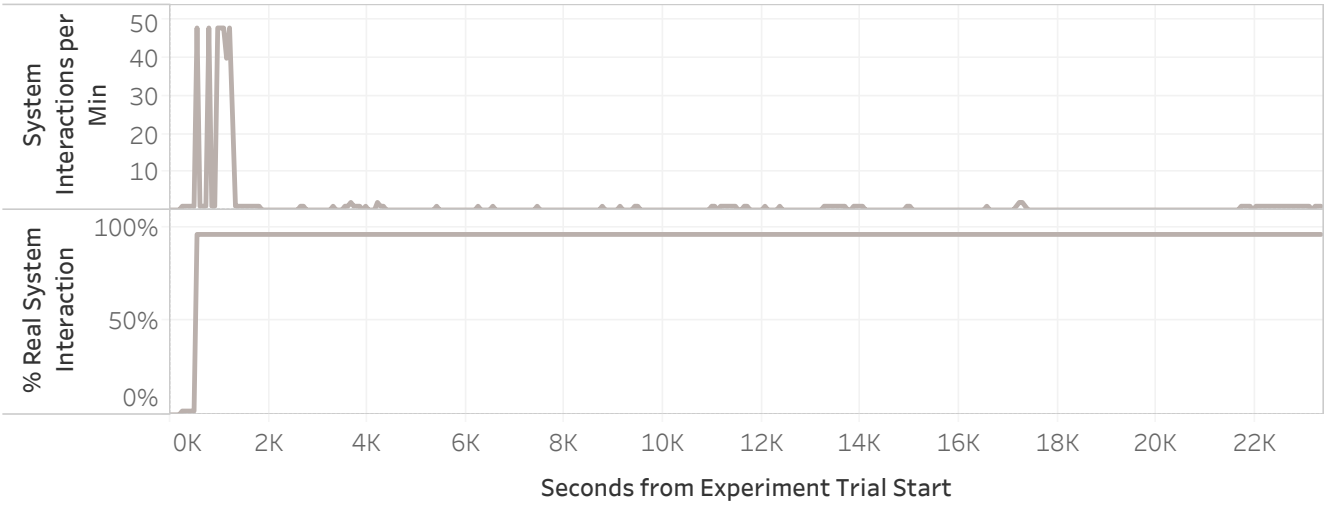


S129 - Day 2 - AIAU

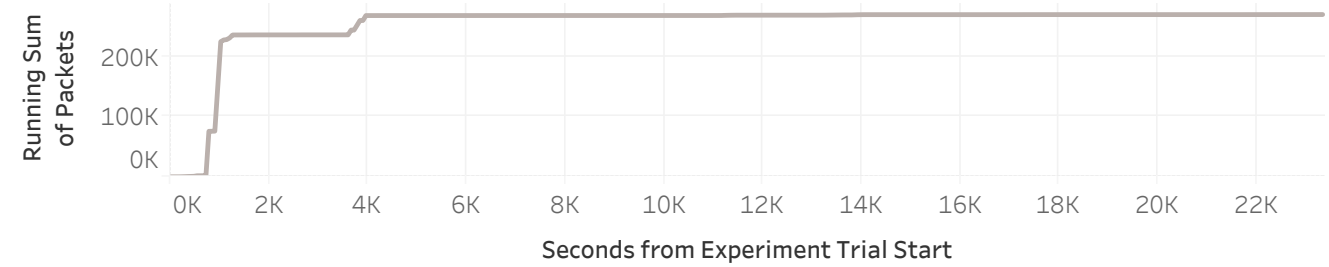
Real Packets per Minute



Real System Interaction Timeline

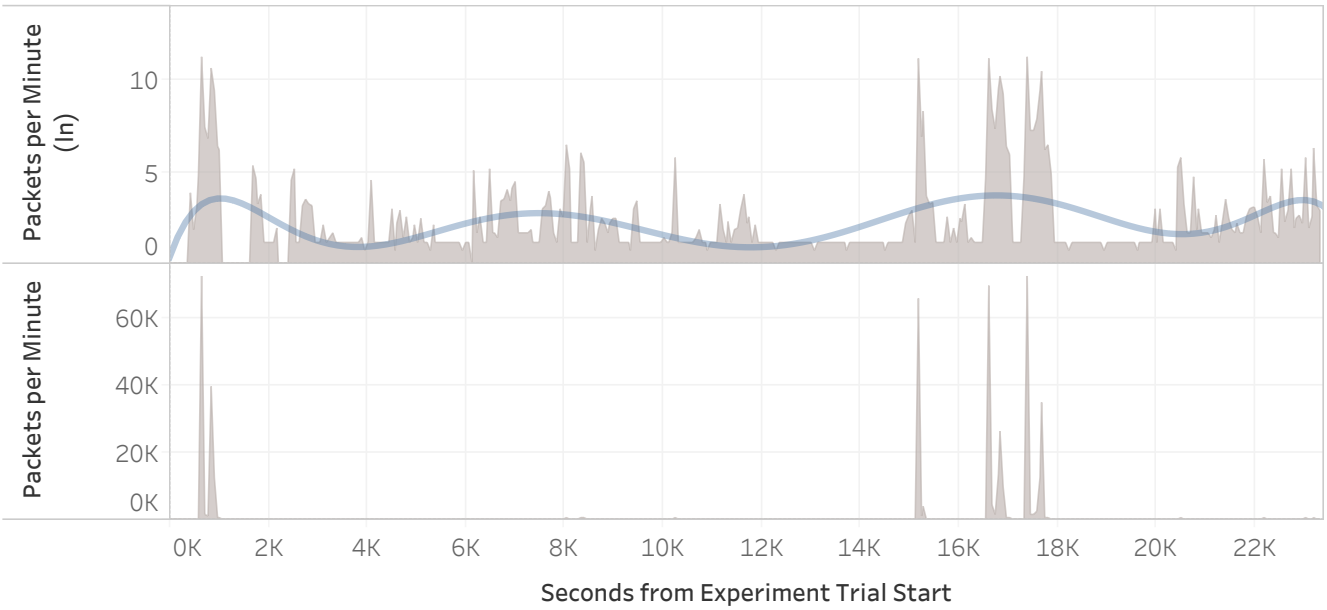


Running Sum of Packets

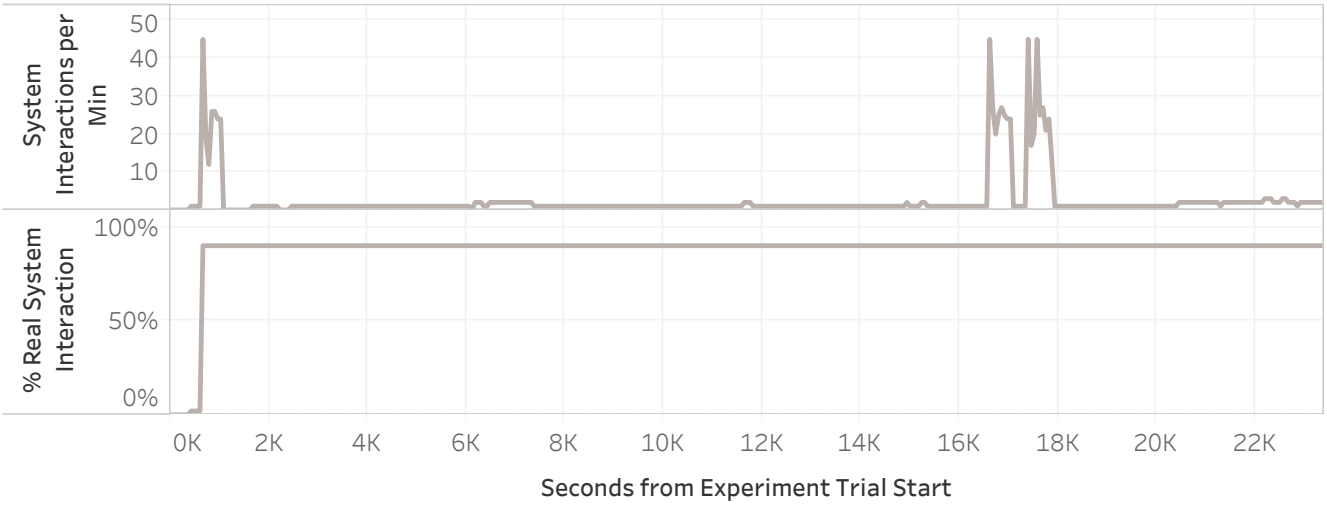


S130 - Day 2 - AIAU

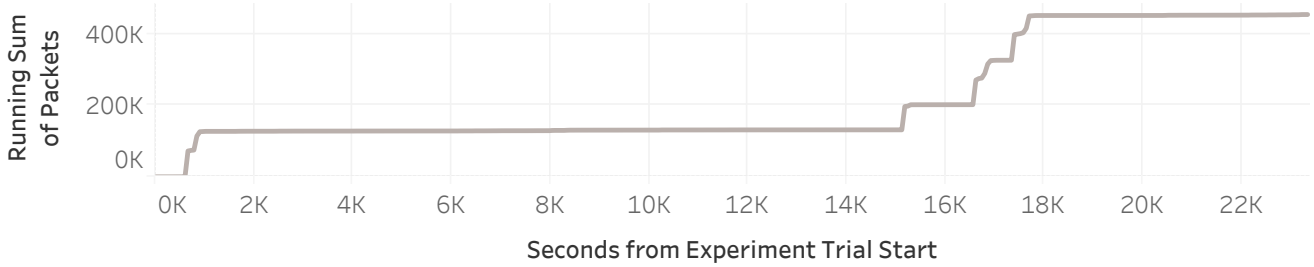
Real Packets per Minute



Real System Interaction Timeline

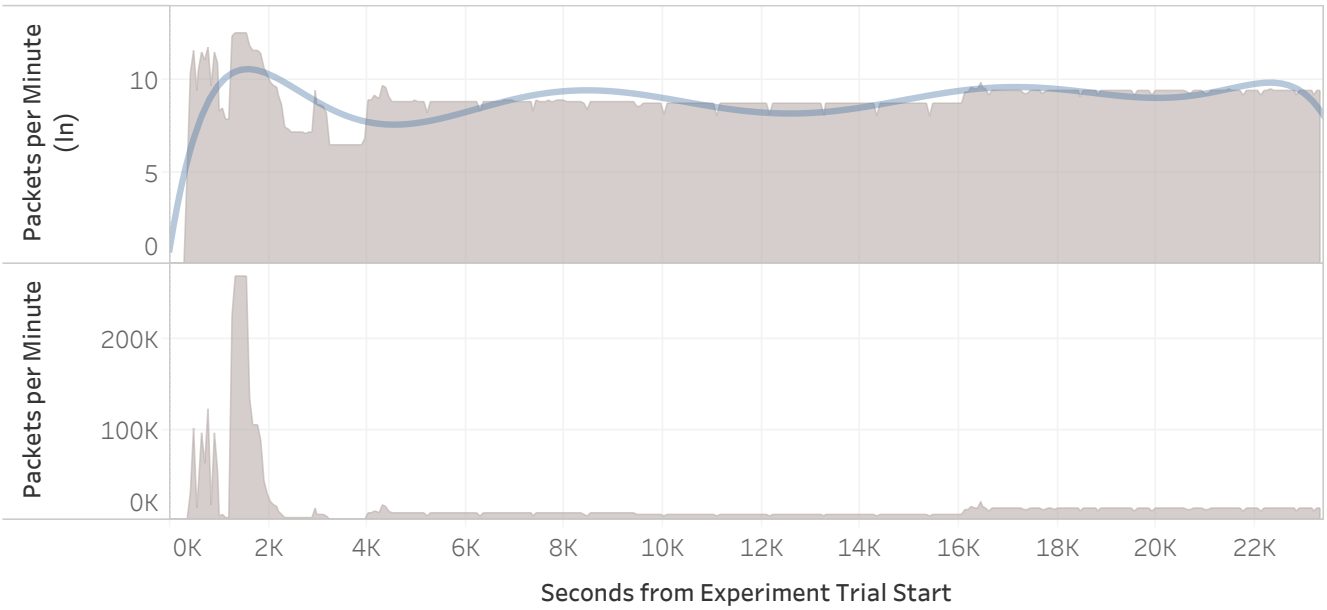


Running Sum of Packets

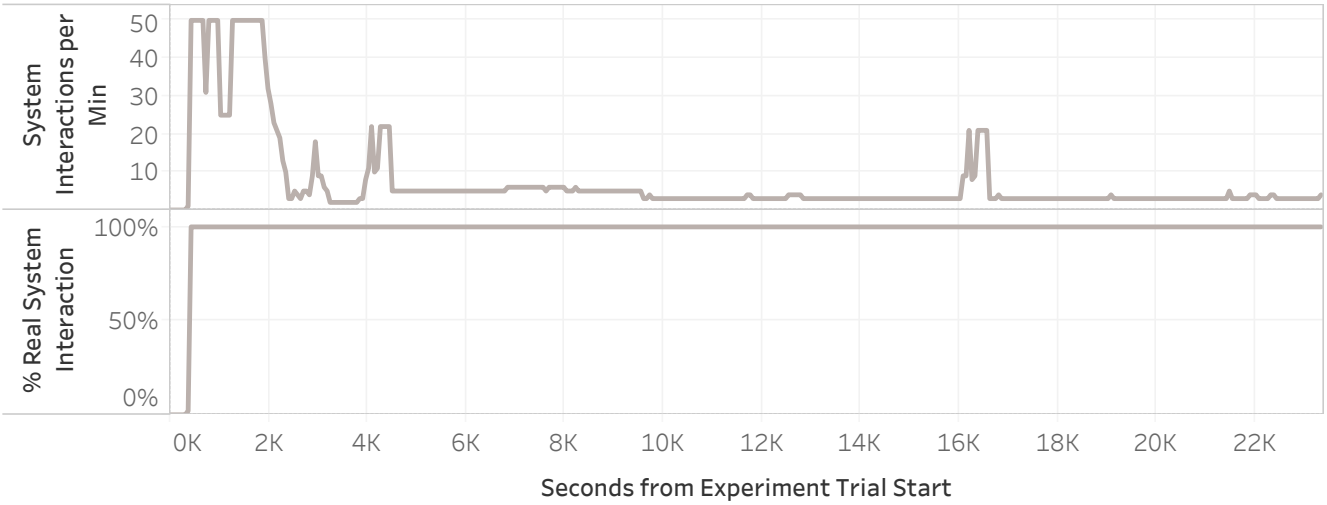


S131 - Day 2 - AIAU

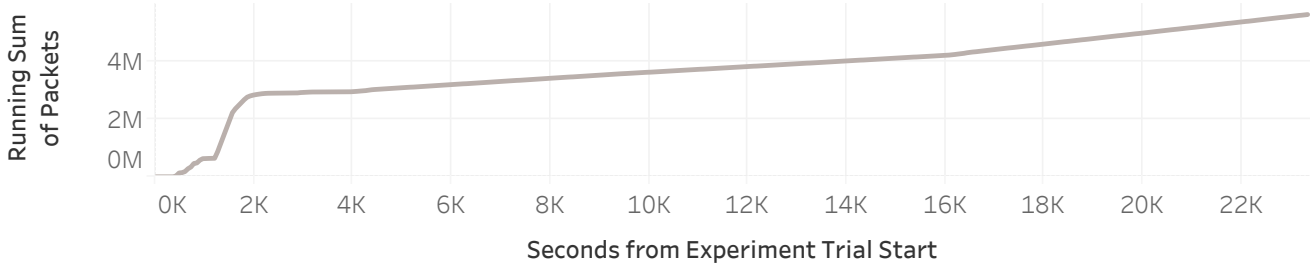
Real Packets per Minute



Real System Interaction Timeline

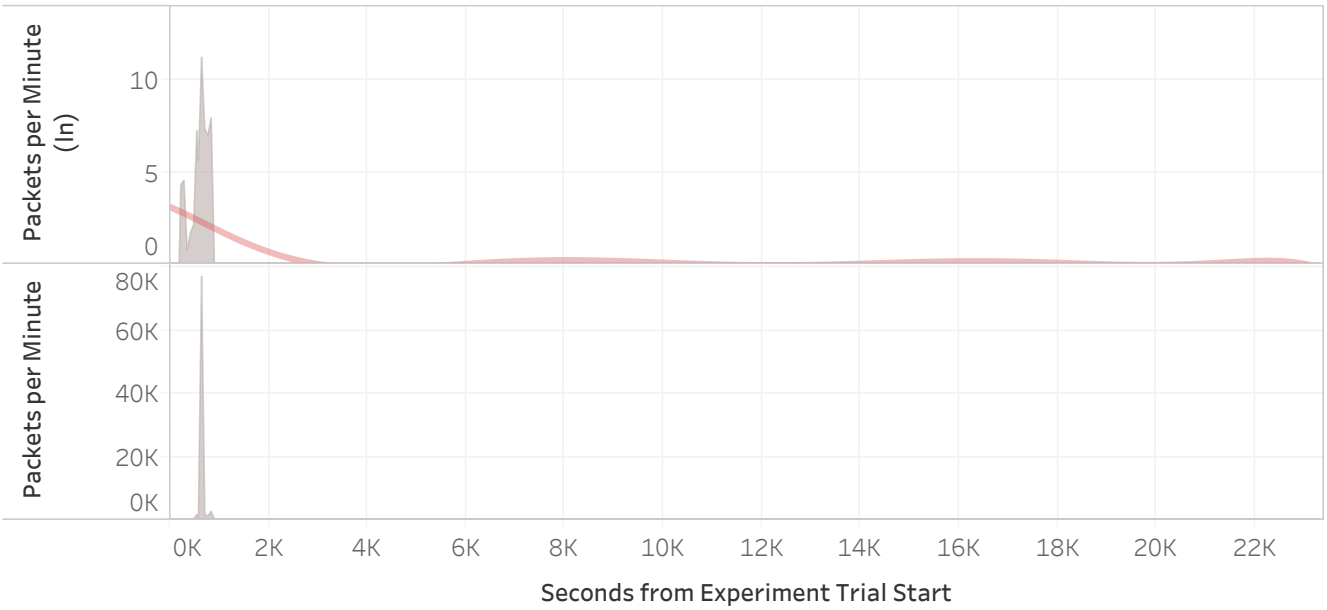


Running Sum of Packets

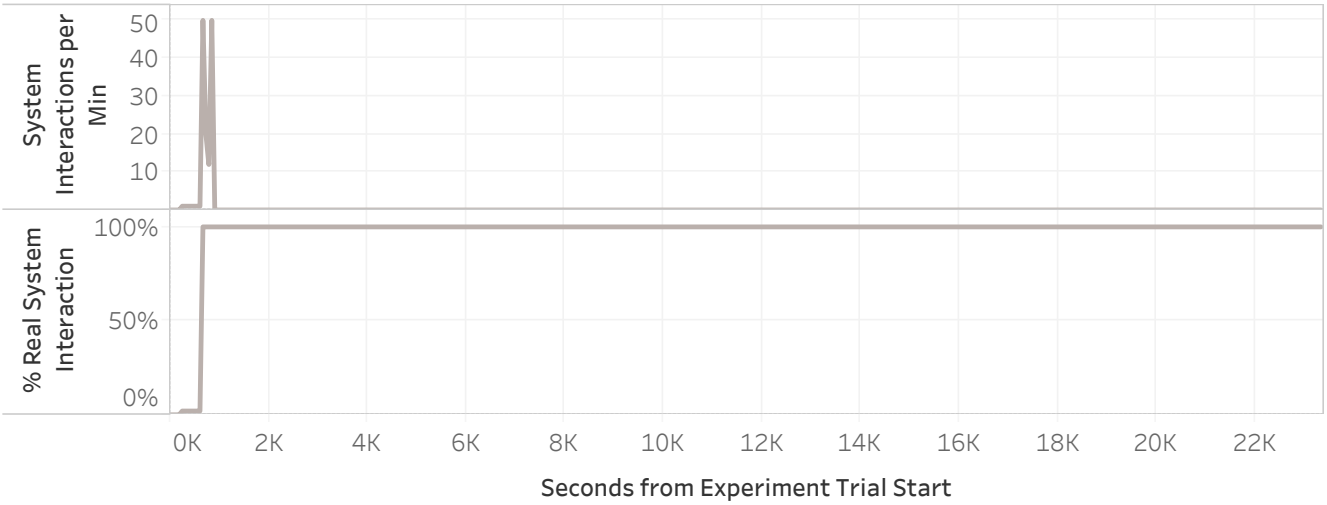


S132 - Day 2 - PUAU

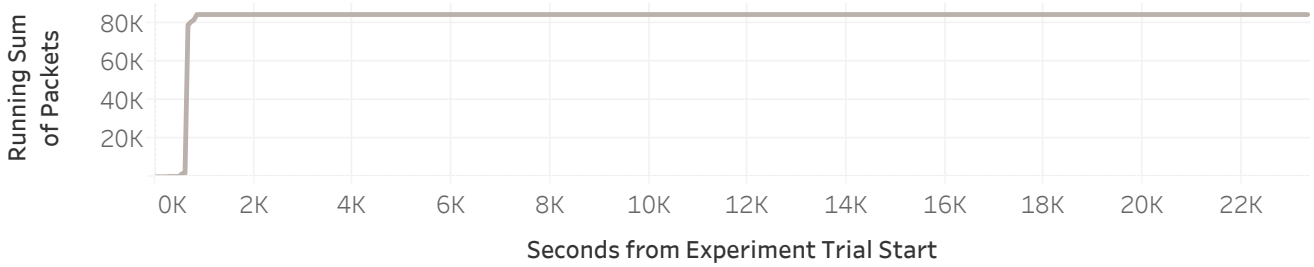
Real Packets per Minute



Real System Interaction Timeline



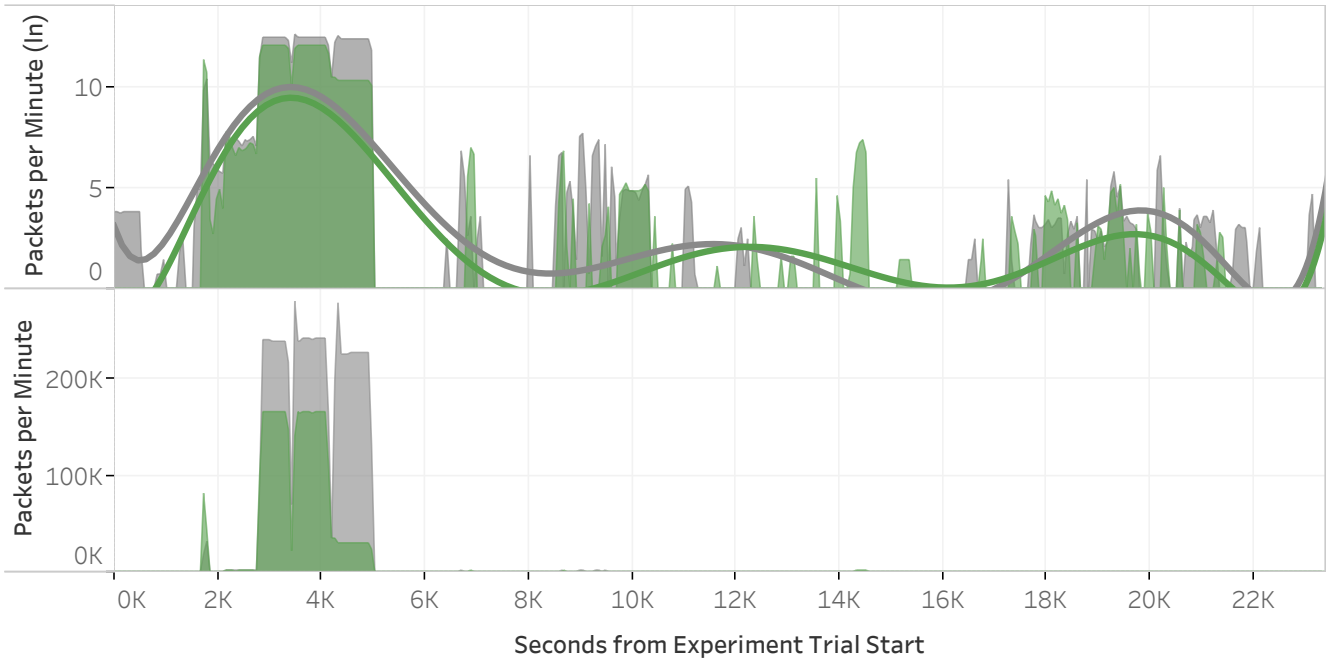
Running Sum of Packets



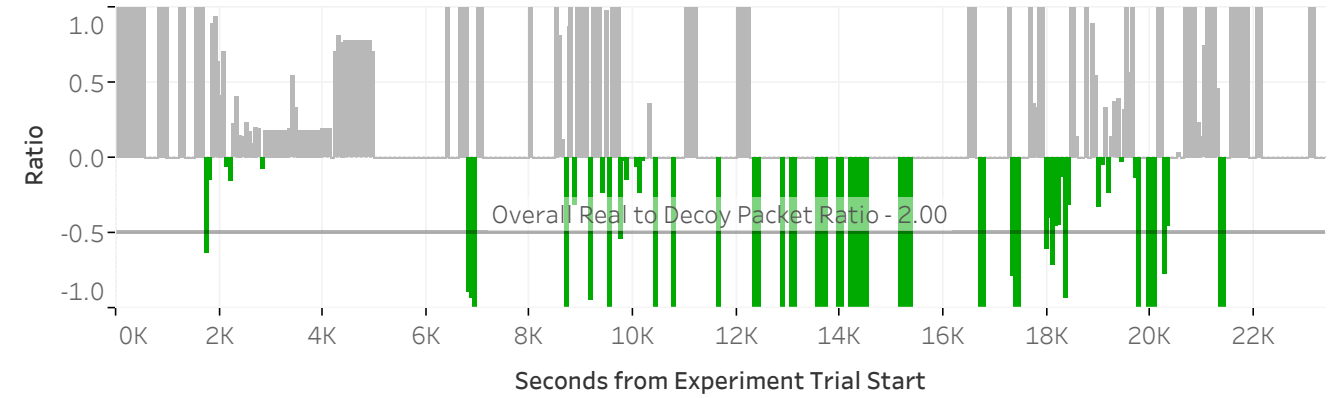
S133 - Day2 - AUPU

Legend
Real Systems
Decoy Systems

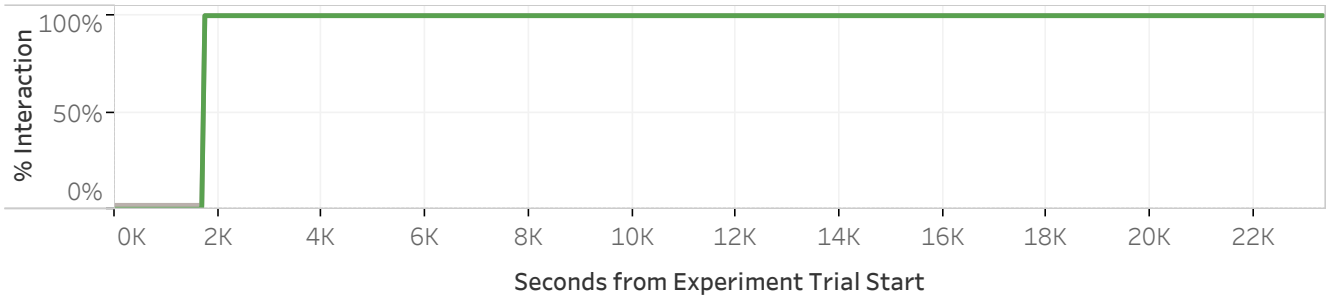
Real & Decoy Packets per Minute

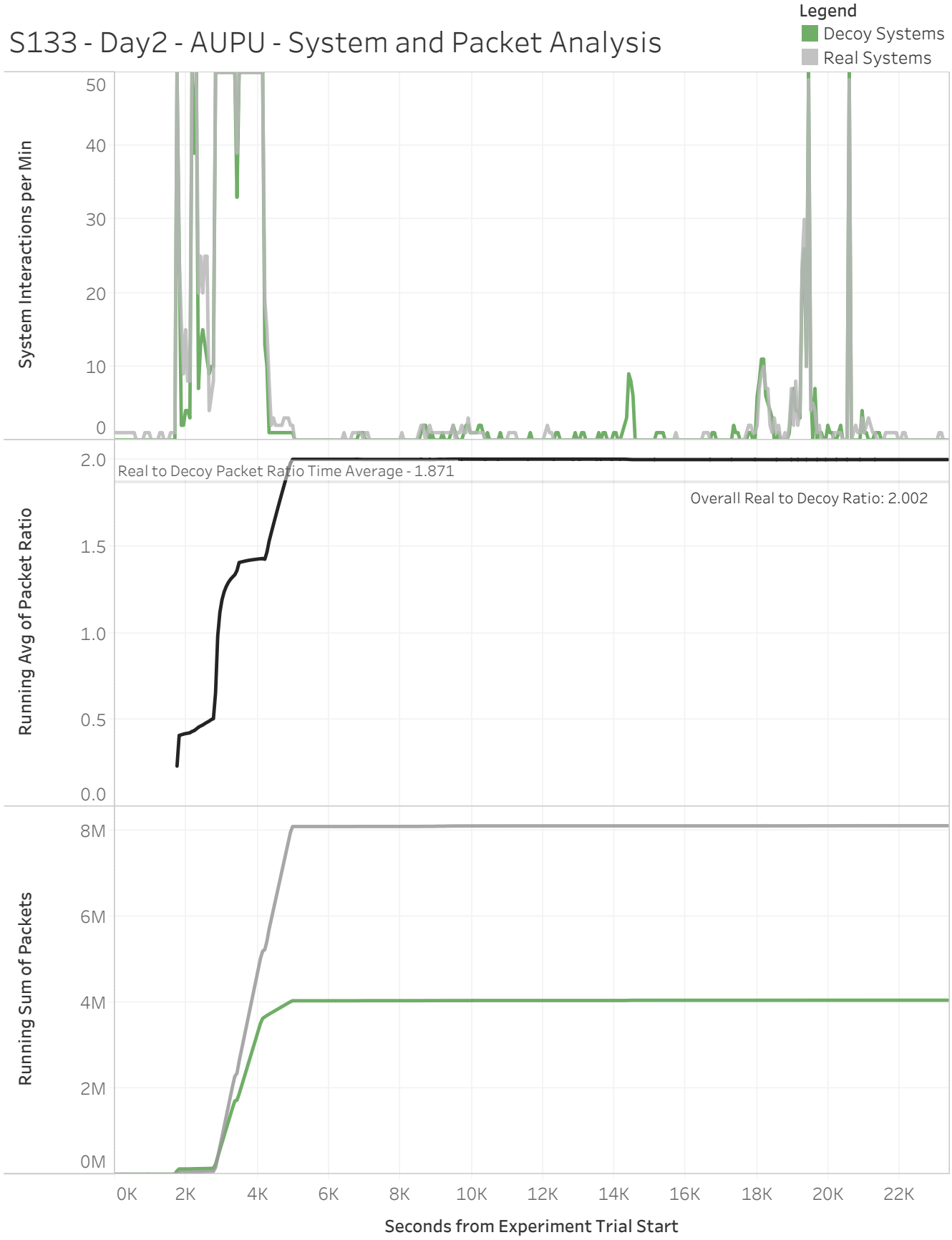


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

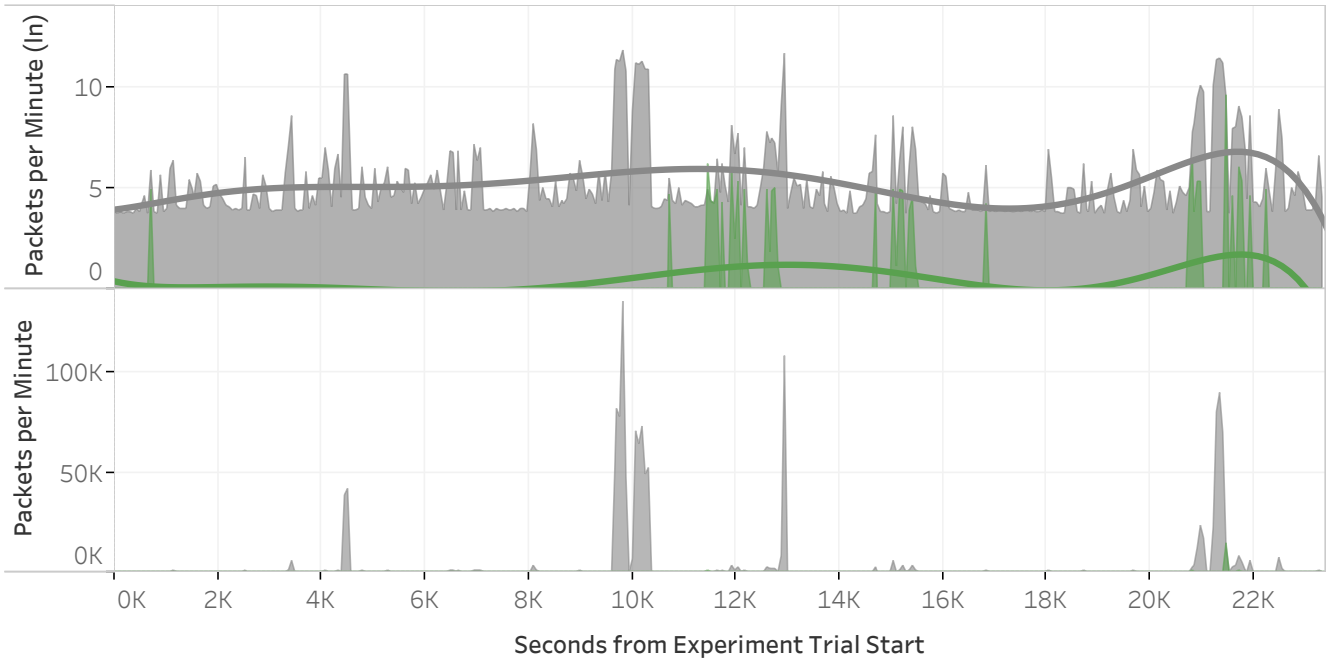



S133 - Day2 - AUPU - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
2.0
1.5
1.0
0.5
0.0
Real to Decoy Packet Ratio Time Average - 1.871
Overall Real to Decoy Ratio: 2.002
Running Sum of Packets
8M
6M
4M
2M
0M
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

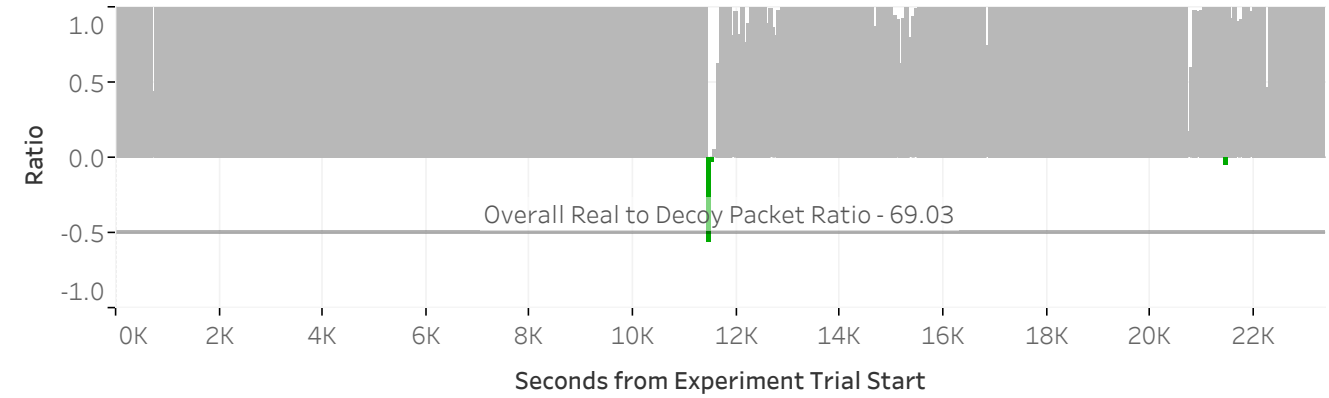
S134 - Day2 - AUPU

Legend
Real Systems
Decoy Systems

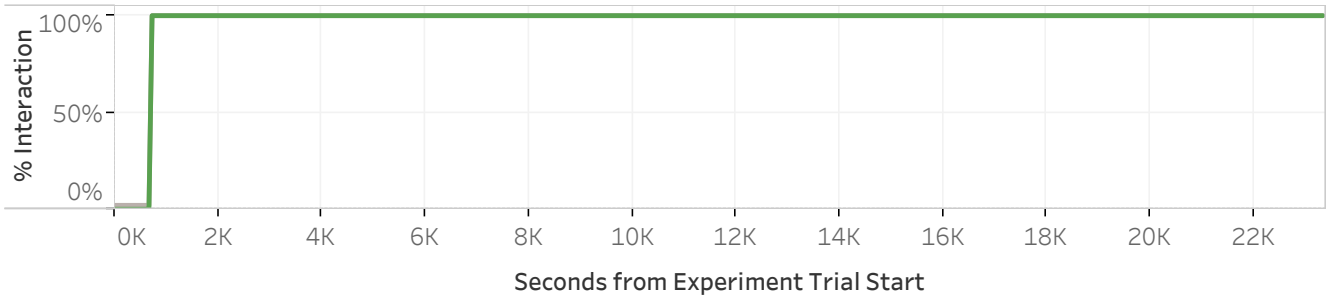
Real & Decoy Packets per Minute

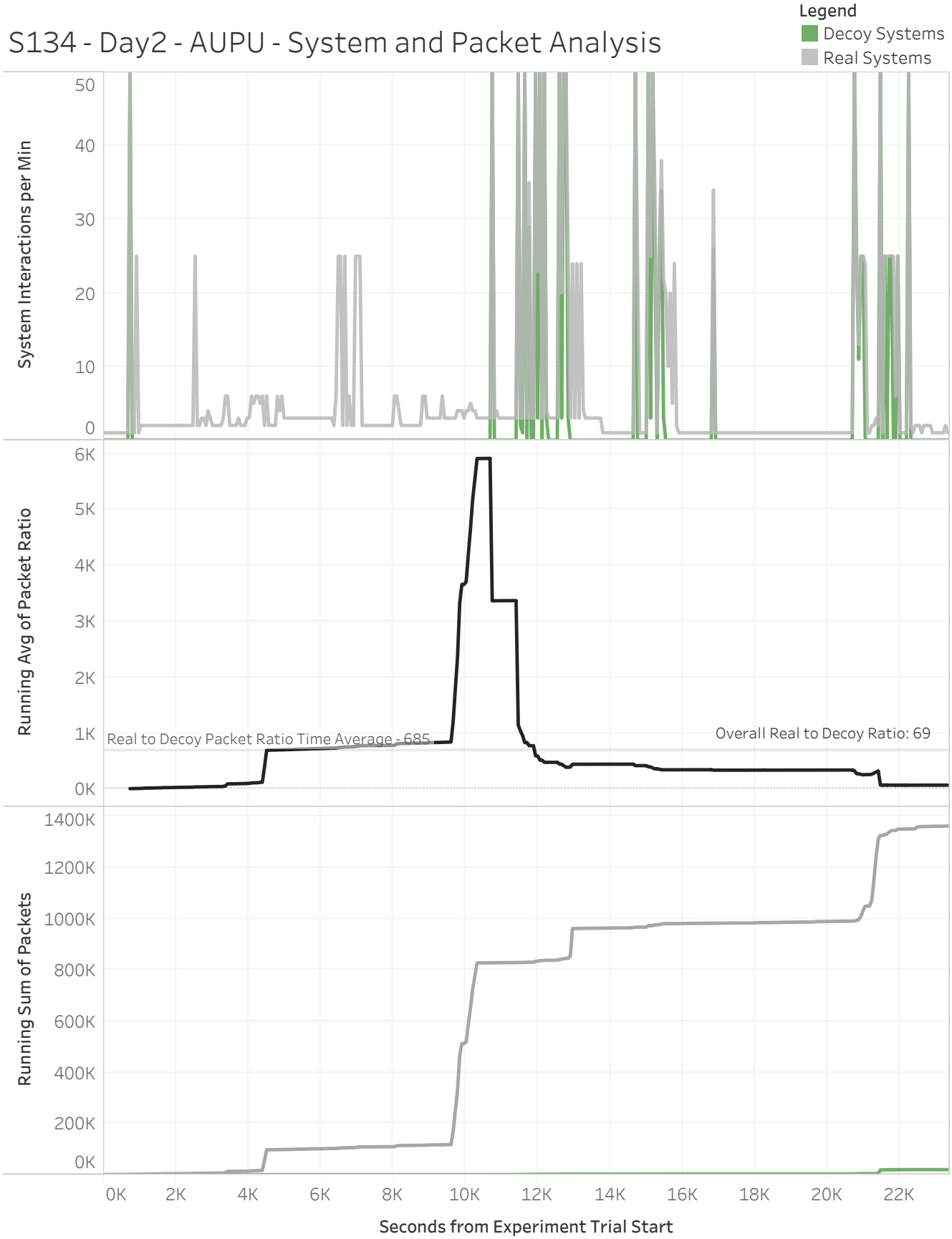


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

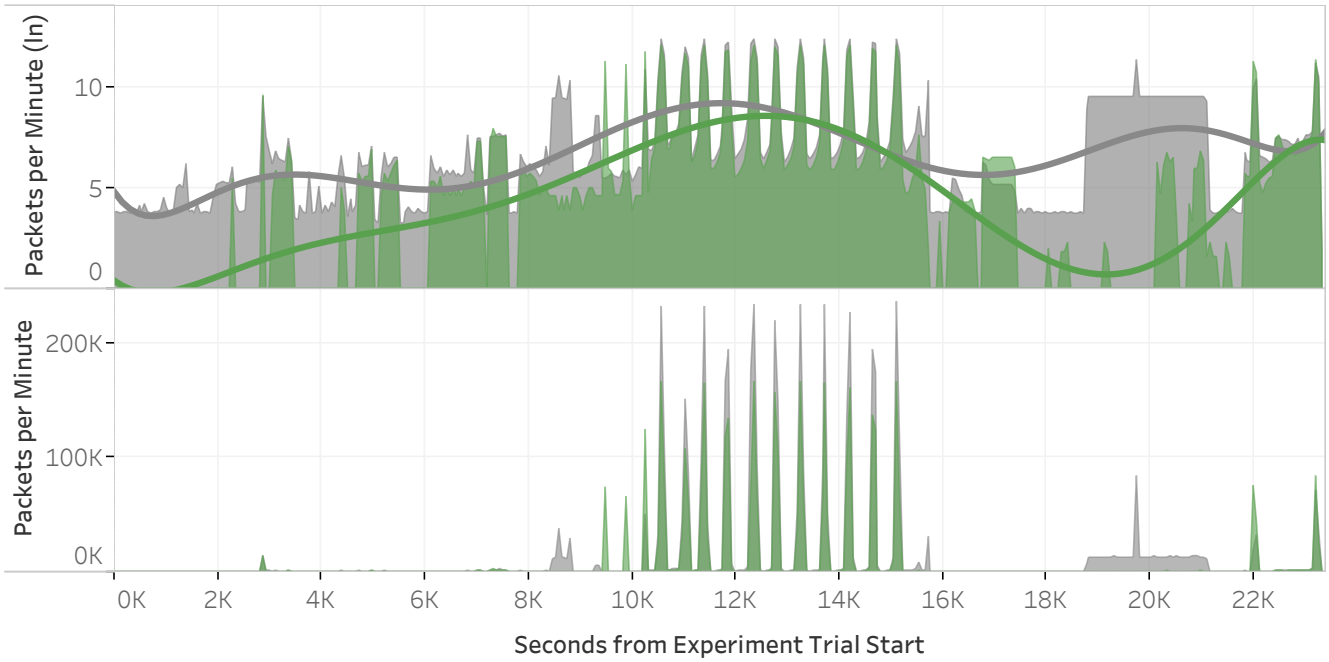



S134 - Day2 - AUPU - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
6K
5K
4K
3K
2K
1K
0K
Real to Decoy Packet Ratio Time Average - 685
Overall Real to Decoy Ratio: 69
Running Sum of Packets
1400K
1200K
1000K
800K
600K
400K
200K
0K
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

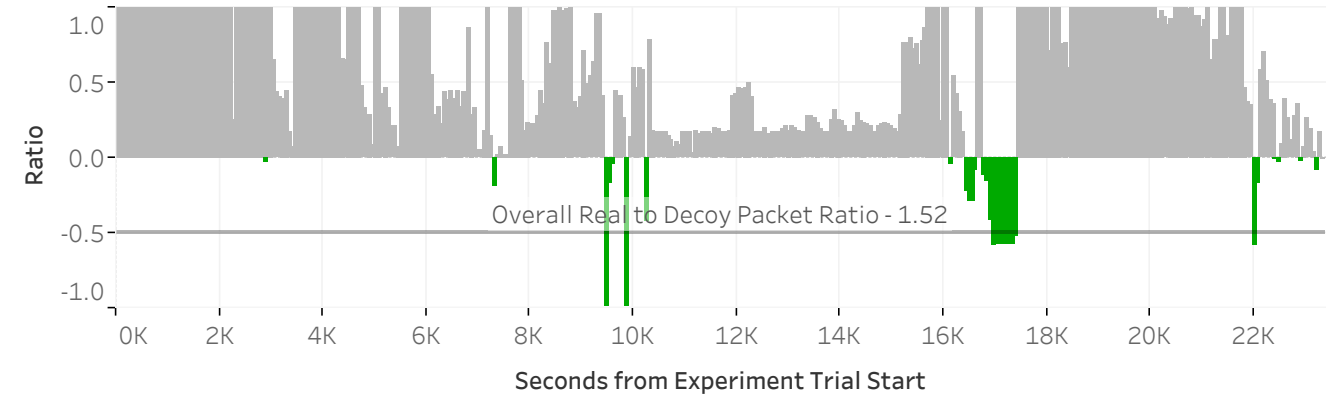
S135 - Day2 - AUPU

Legend
Real Systems
Decoy Systems

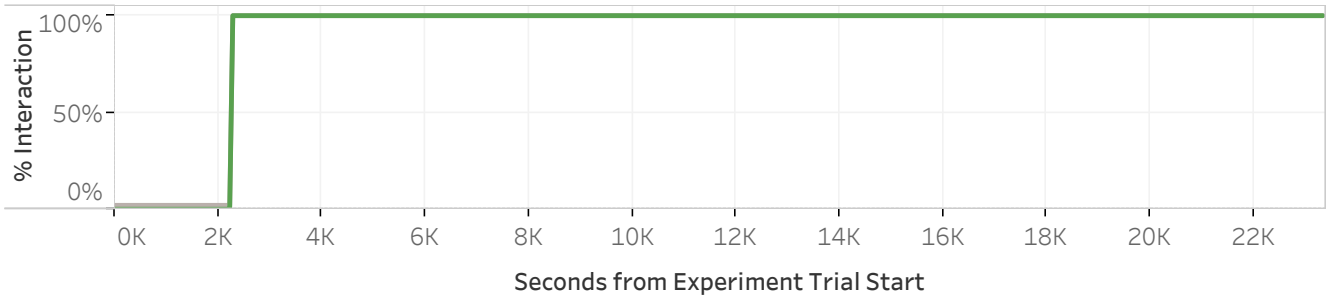
Real & Decoy Packets per Minute

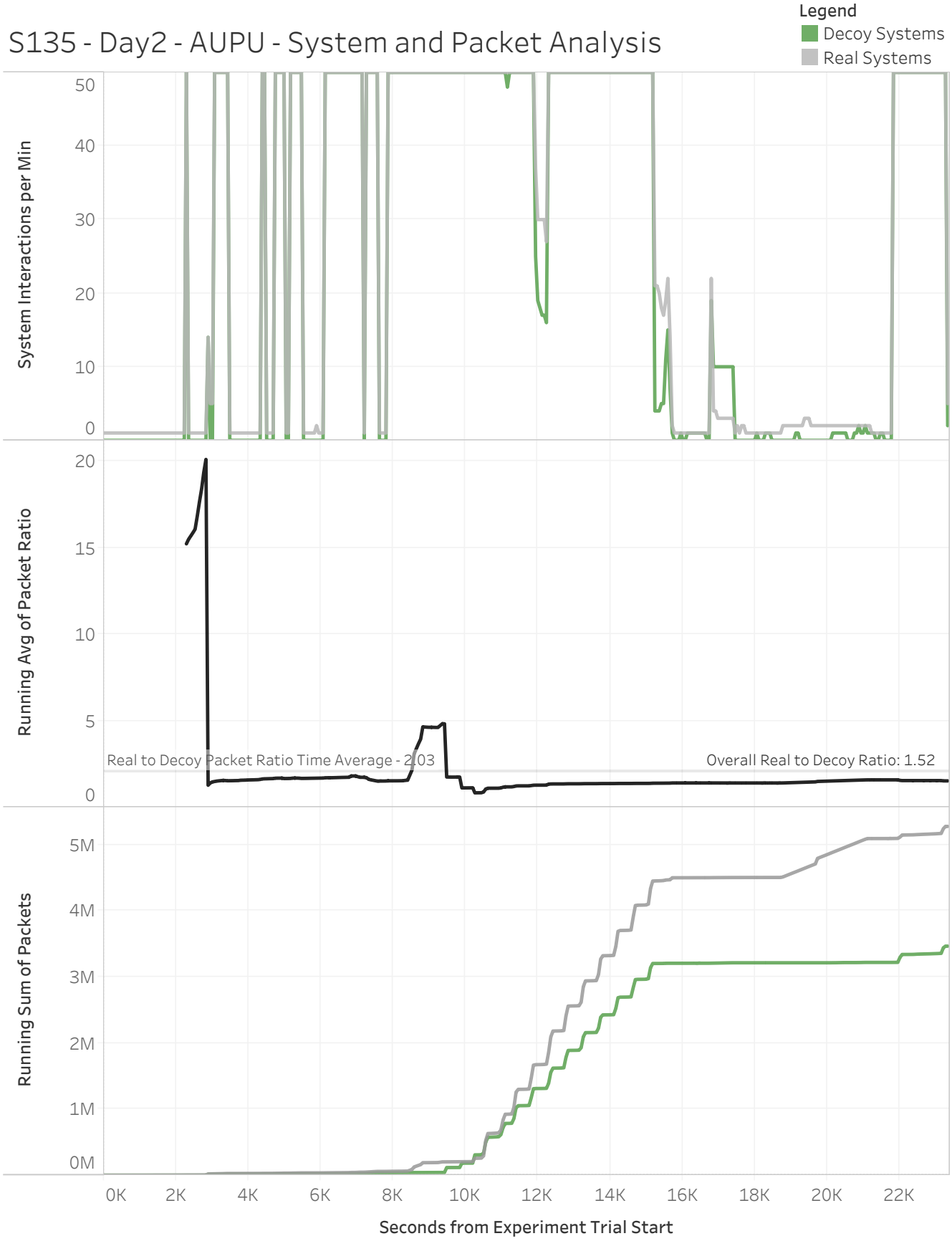


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

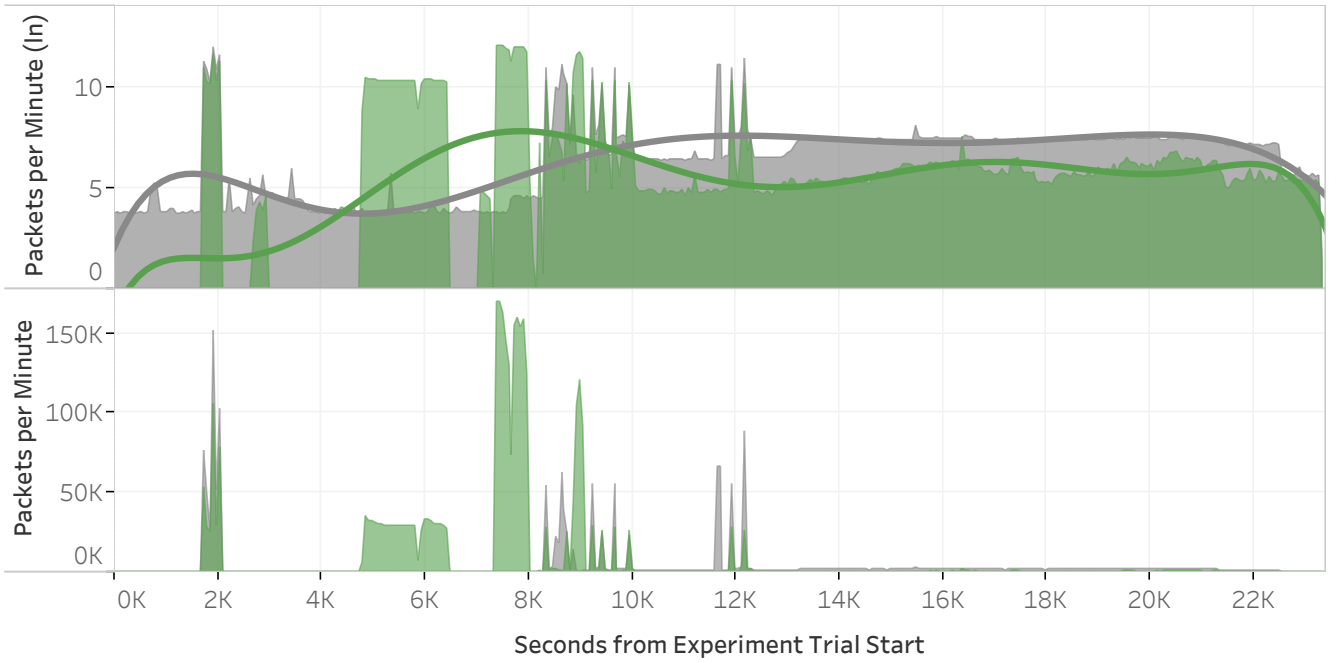



S135 - Day2 - AUPU - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
20
15
10
5
0
Real to Decoy Packet Ratio Time Average - 2.03
Overall Real to Decoy Ratio: 1.52
Running Sum of Packets
5M
4M
3M
2M
1M
0M
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

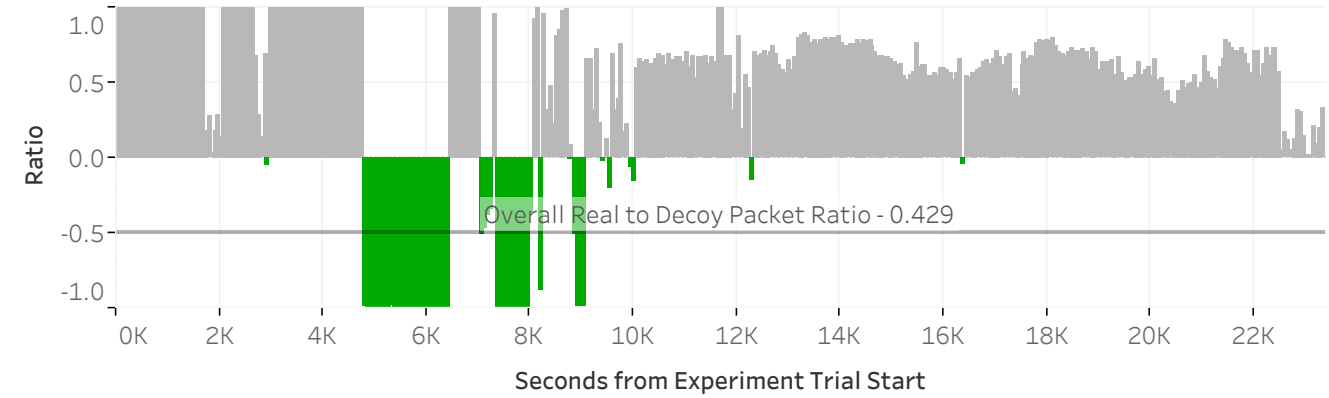
S136 - Day2 - AUPU

Legend
Real Systems
Decoy Systems

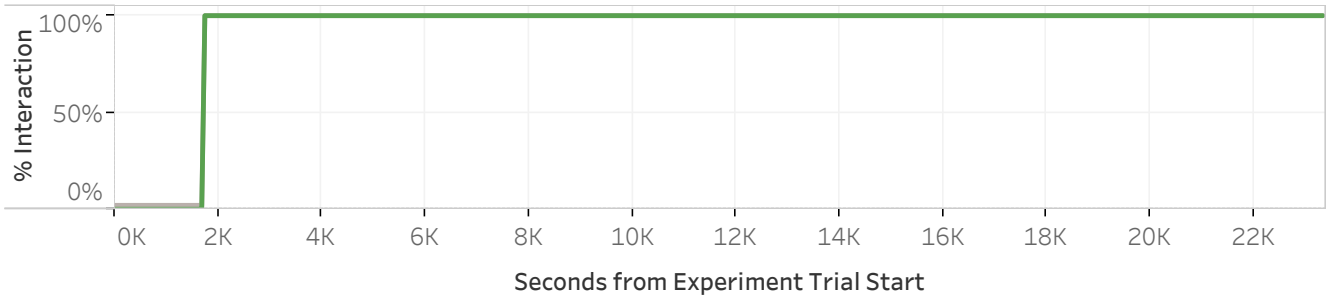
Real & Decoy Packets per Minute

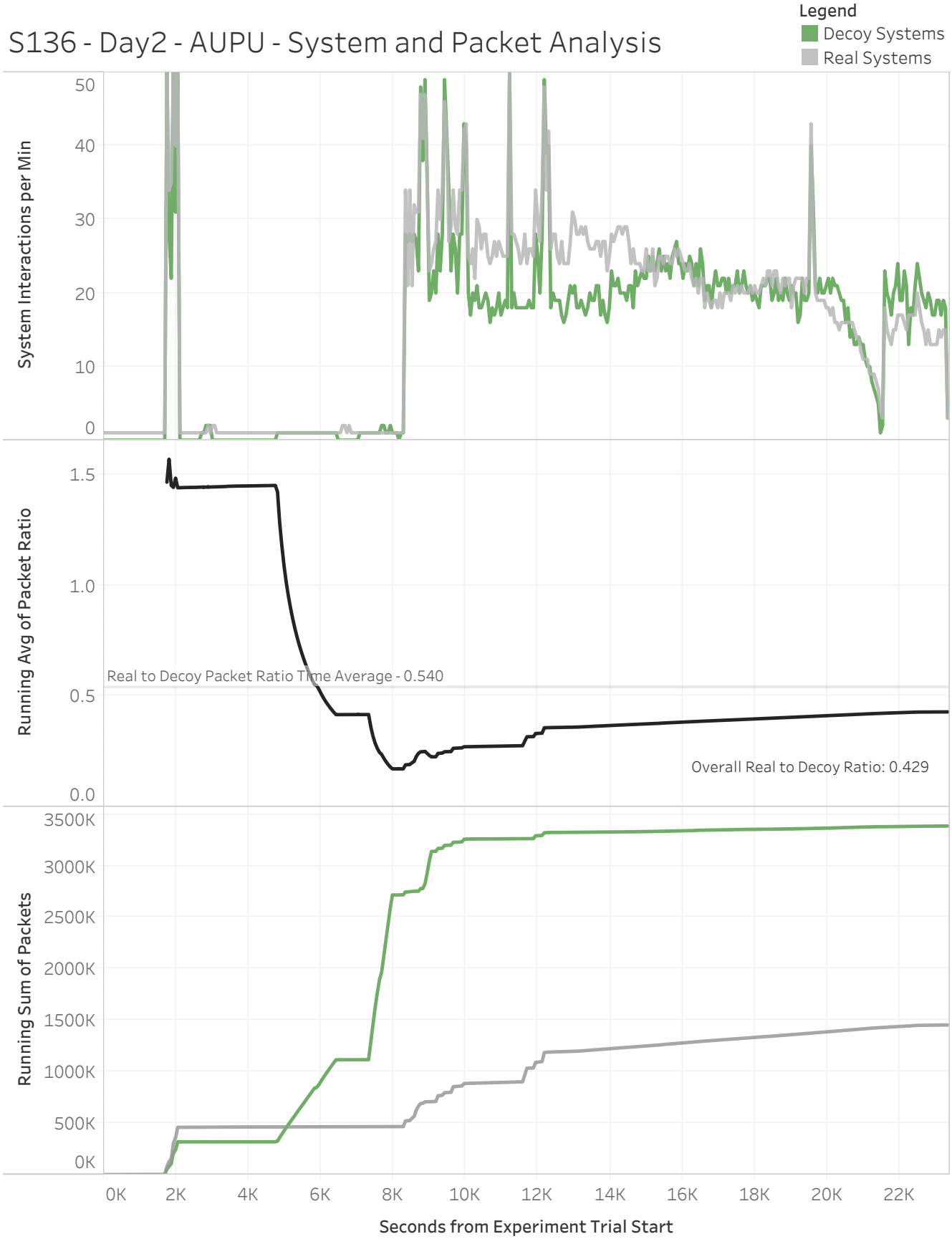


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

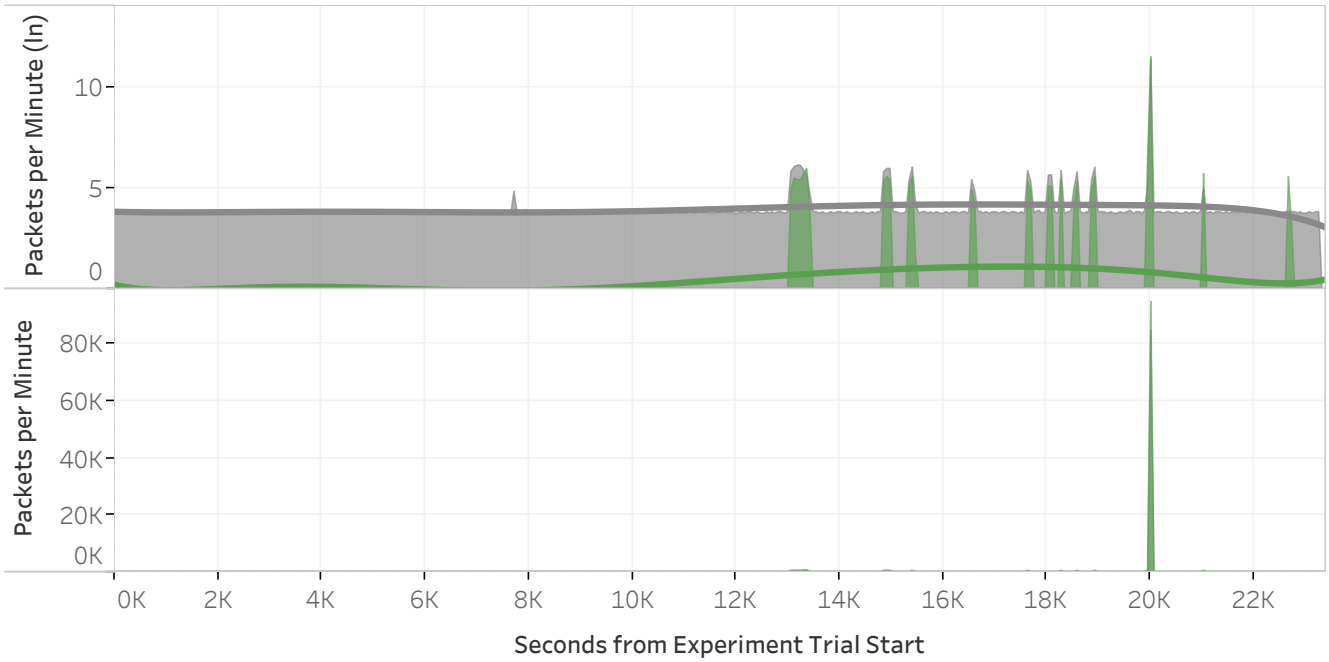



S136 - Day2 - AUPU - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
1.5
1.0
0.5
0.0
Real to Decoy Packet Ratio Time Average - 0.540
Overall Real to Decoy Ratio: 0.429
Running Sum of Packets
3500K
3000K
2500K
2000K
1500K
1000K
500K
0K
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

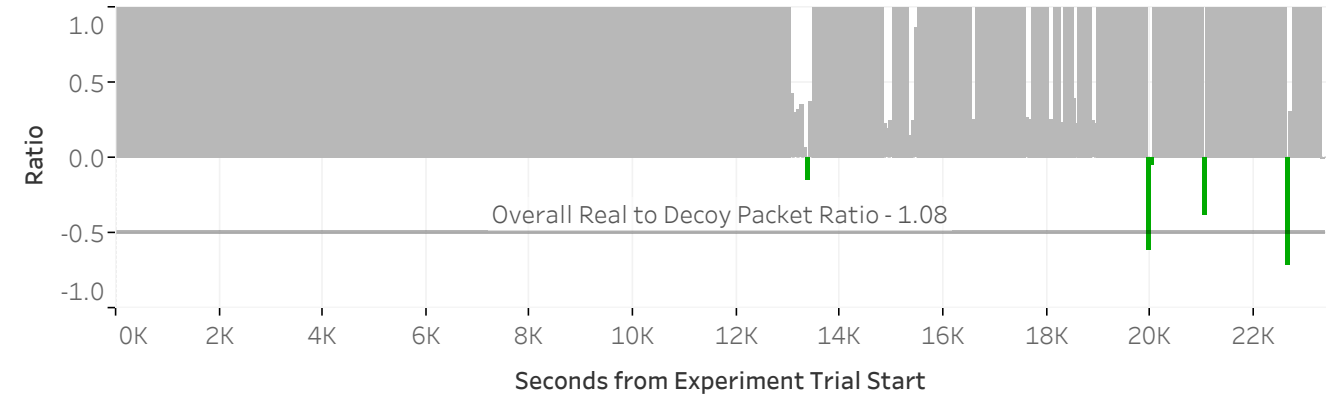
S137 - Day2 - AUPU

Legend
Real Systems
Decoy Systems

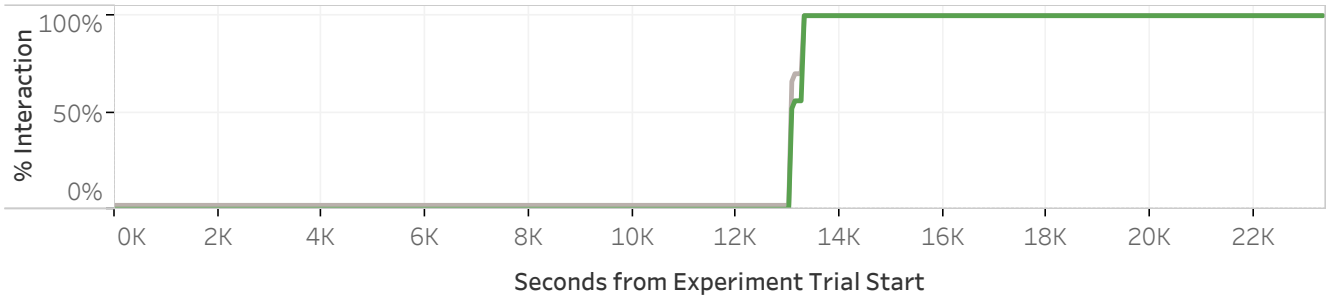
Real & Decoy Packets per Minute

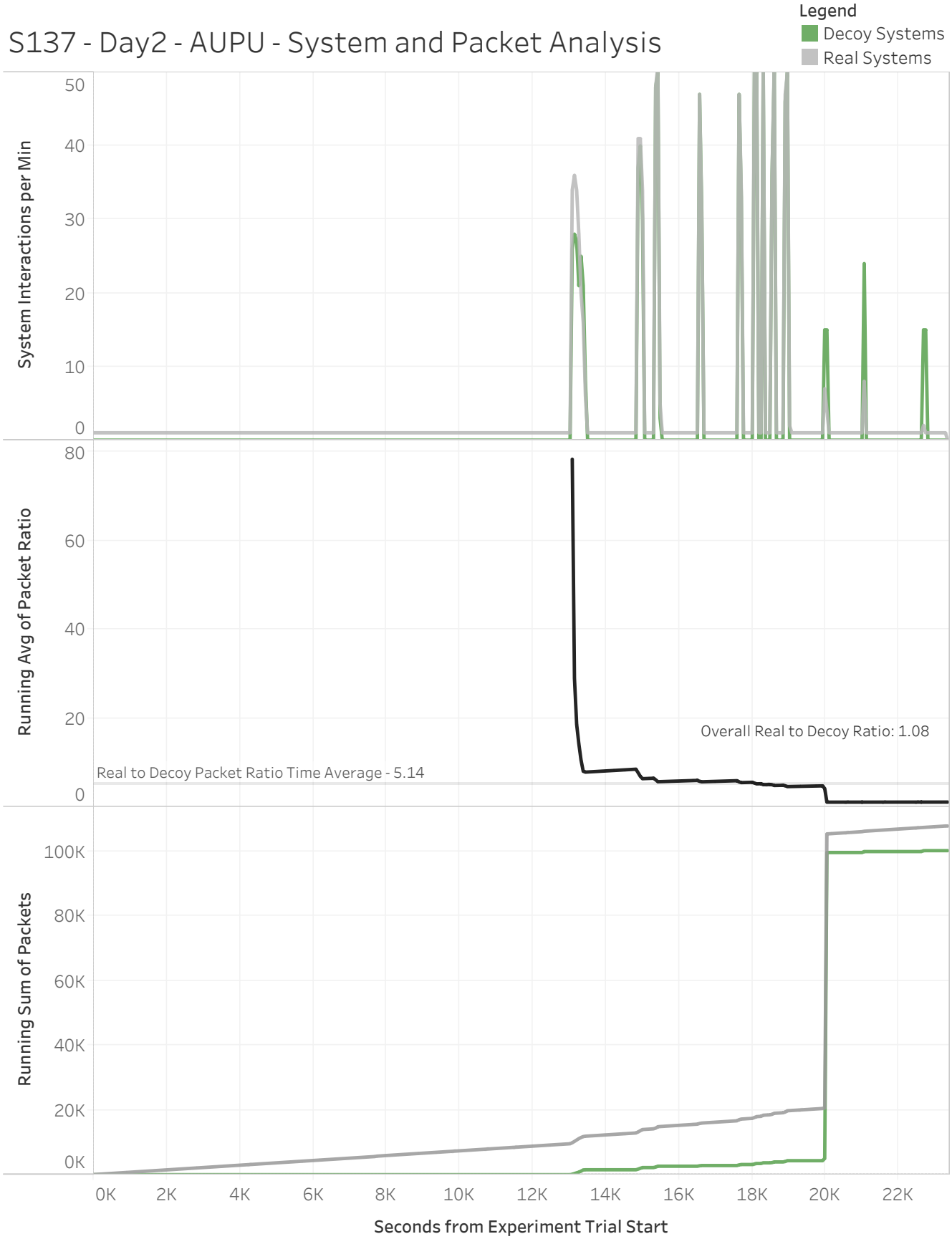


Real to Decoy Packet Ratio



Real & Decoy System Interaction Timeline

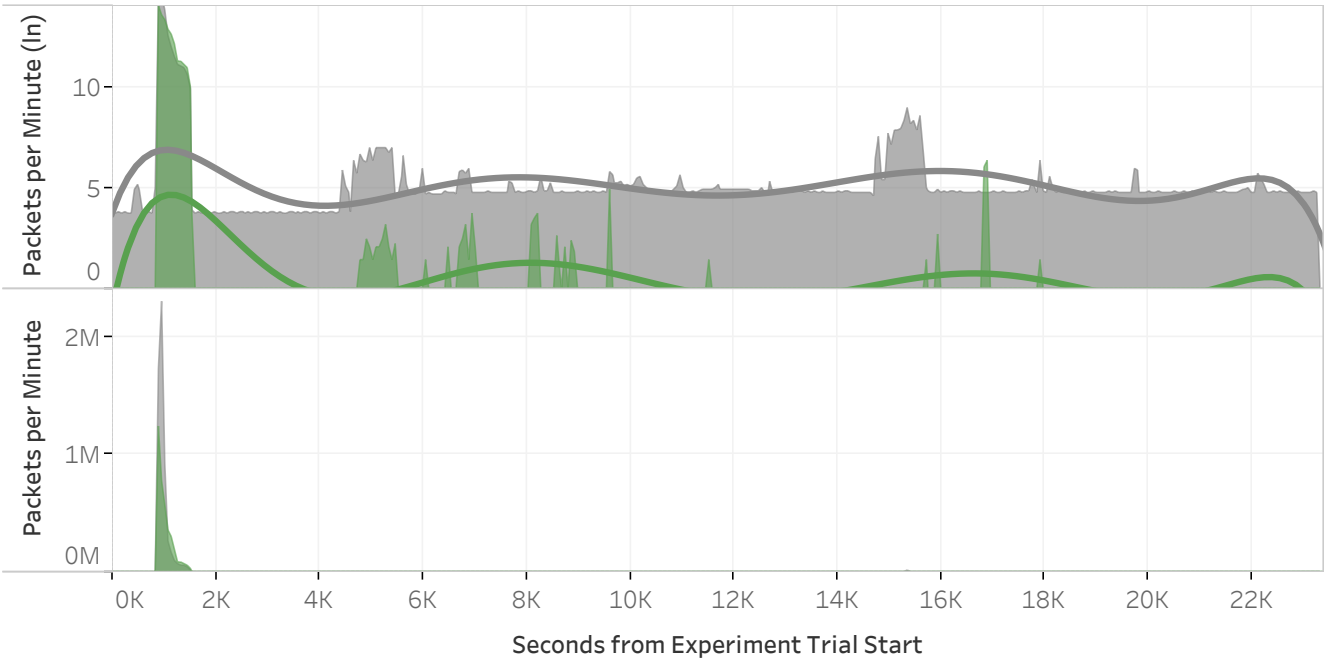



S137 - Day2 - AUPU - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
80
60
40
20
0
Overall Real to Decoy Ratio: 1.08
Real to Decoy Packet Ratio Time Average - 5.14
Running Sum of Packets
100K
80K
60K
40K
20K
0K
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

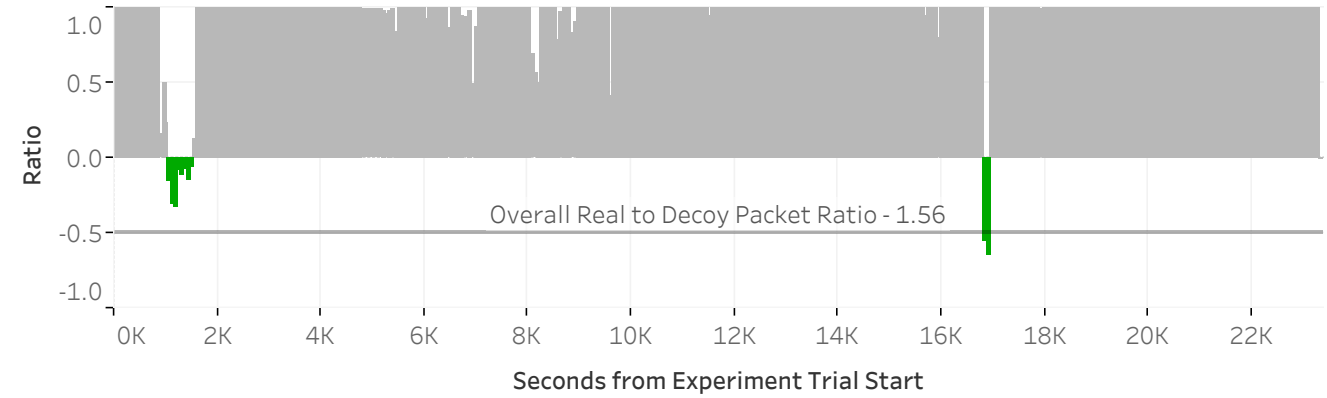
S138 - Day2 - AUPU

Legend
Real Systems
Decoy Systems

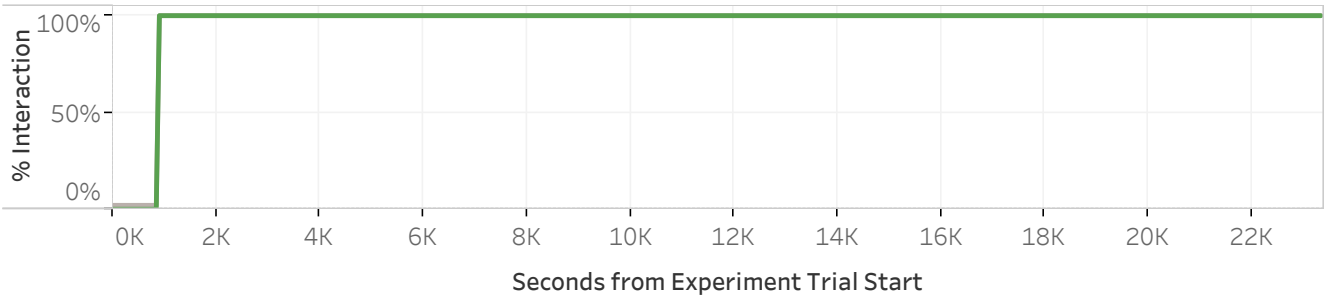
Real & Decoy Packets per Minute

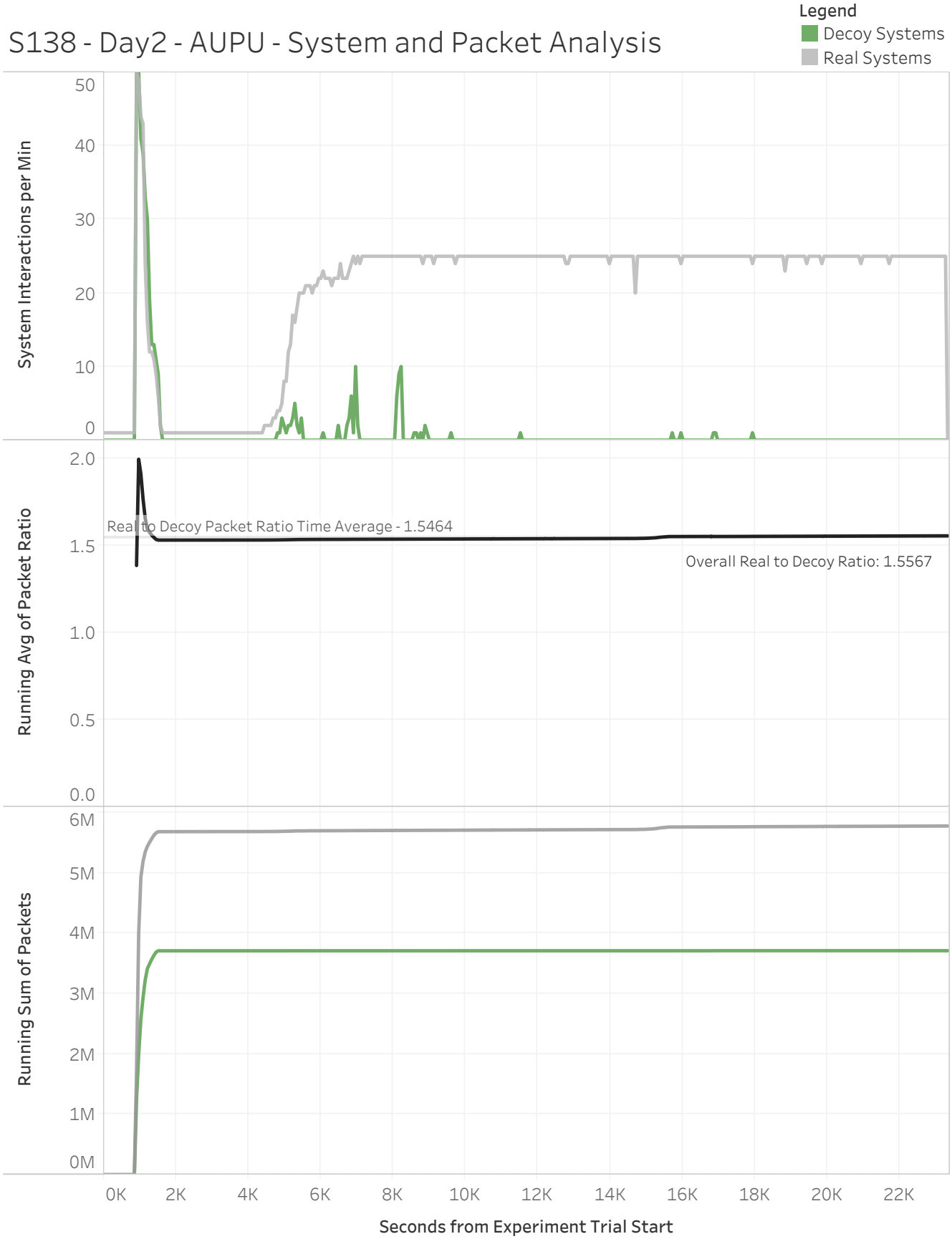


Real to Decoy Packet Ratio



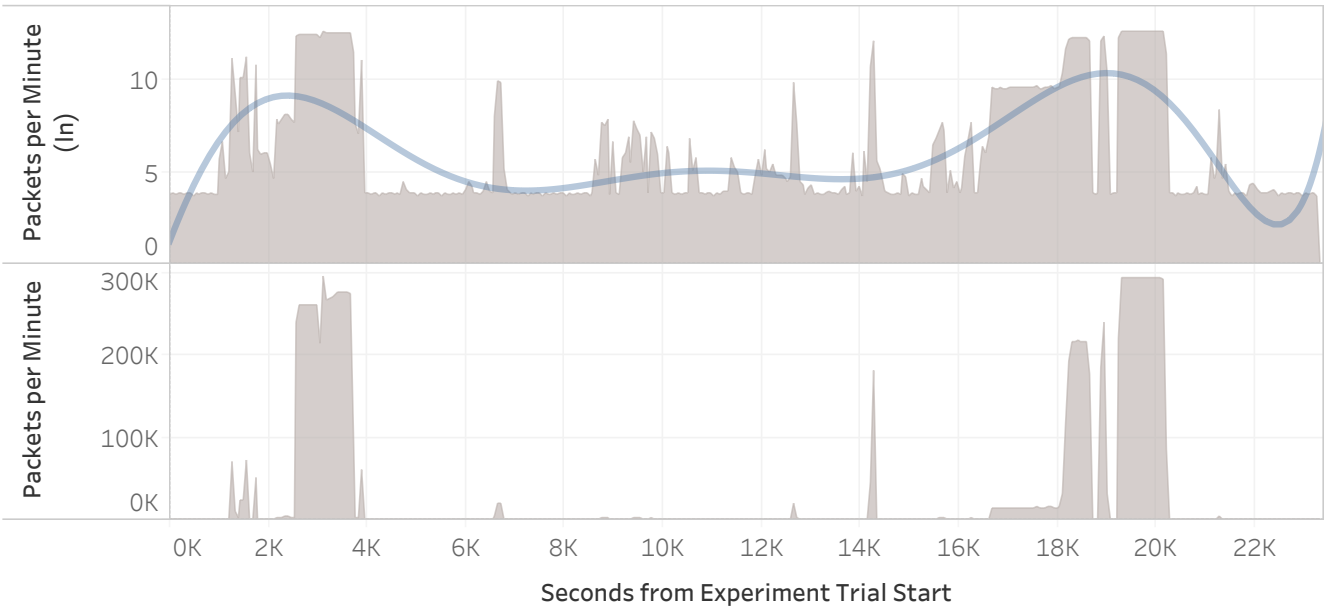
Real & Decoy System Interaction Timeline



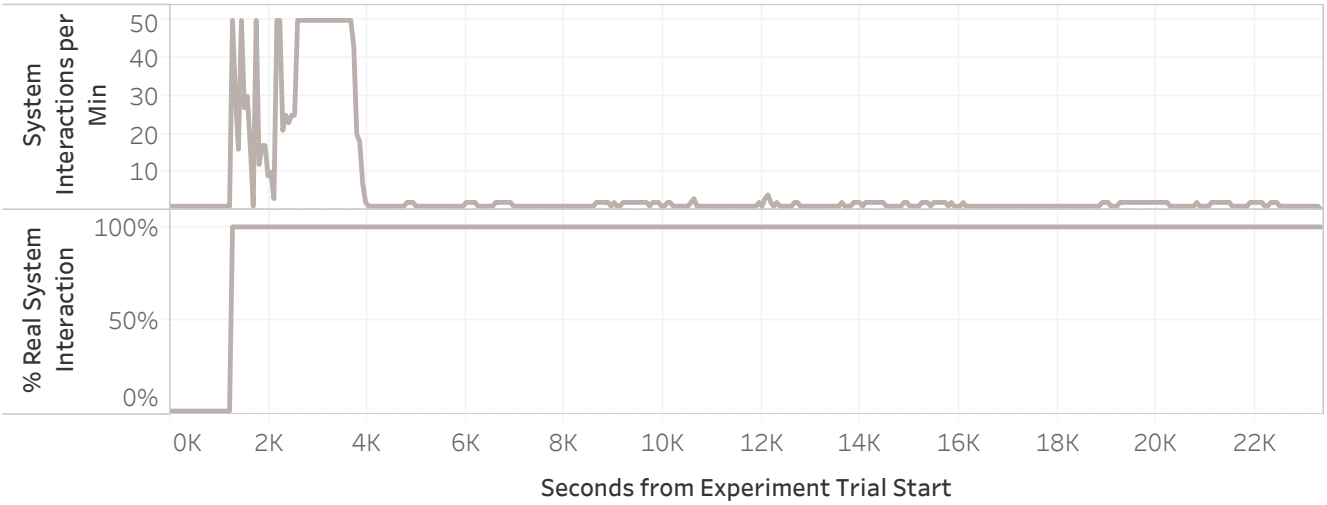

S138 - Day2 - AUPU - System and Packet Analysis
Legend
Decoy Systems
Real Systems
System Interactions per Min
50
40
30
20
10
0
Running Avg of Packet Ratio
2.0
1.5
1.0
0.5
0.0
Real to Decoy Packet Ratio Time Average - 1.5464
Overall Real to Decoy Ratio: 1.5567
Running Sum of Packets
6M
5M
4M
3M
2M
1M
0M
0K
2K
4K
6K
8K
10K
12K
14K
16K
18K
20K
22K
Seconds from Experiment Trial Start

S139 - Day 2 - AIAU

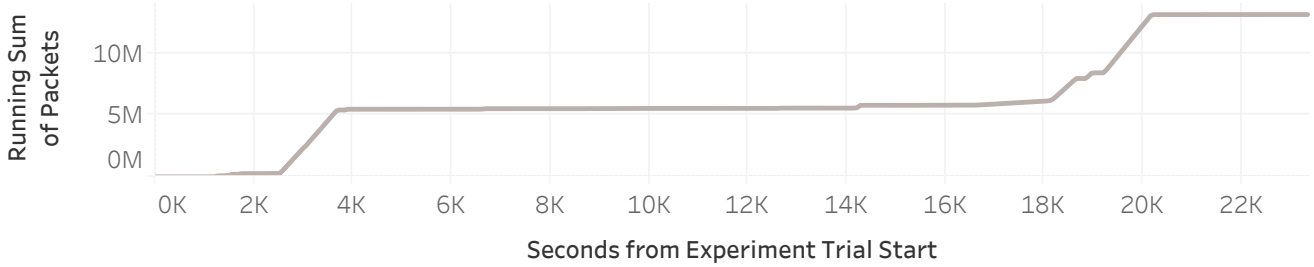
Real Packets per Minute



Real System Interaction Timeline



Running Sum of Packets



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