DPA Contest v4.2
Evaluation results

Chi Zhang, Xibo Sun, Tian Dai, Lihui Wang and Weijun Shan

August 2016

1 Introduction

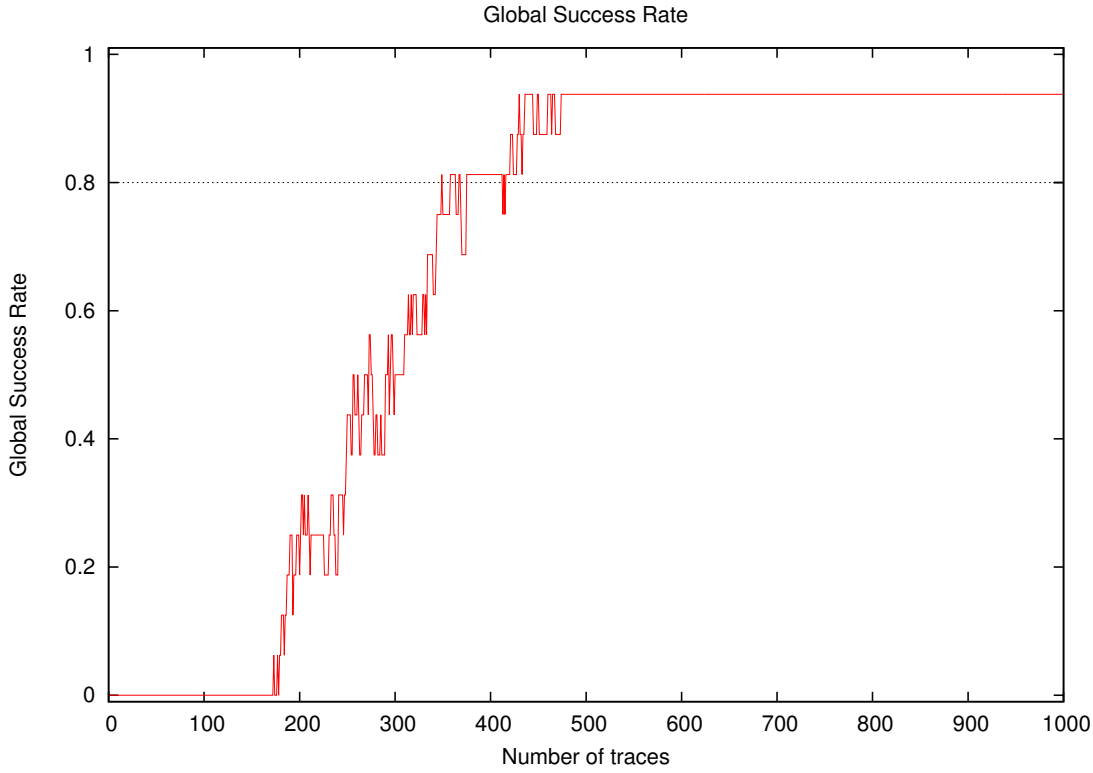
1.1 About the attack

- **Sender/Team:** Chi Zhang, Xibo Sun, Tian Dai, Lihui Wang and Weijun Shan
- **Institution:** Shanghai Fudan Microeletronics Group Company Limited, China
- **Language:** Matlab
- **Operating system:** Windows
- **Attacked subkey:** 0

1.2 About the evaluation

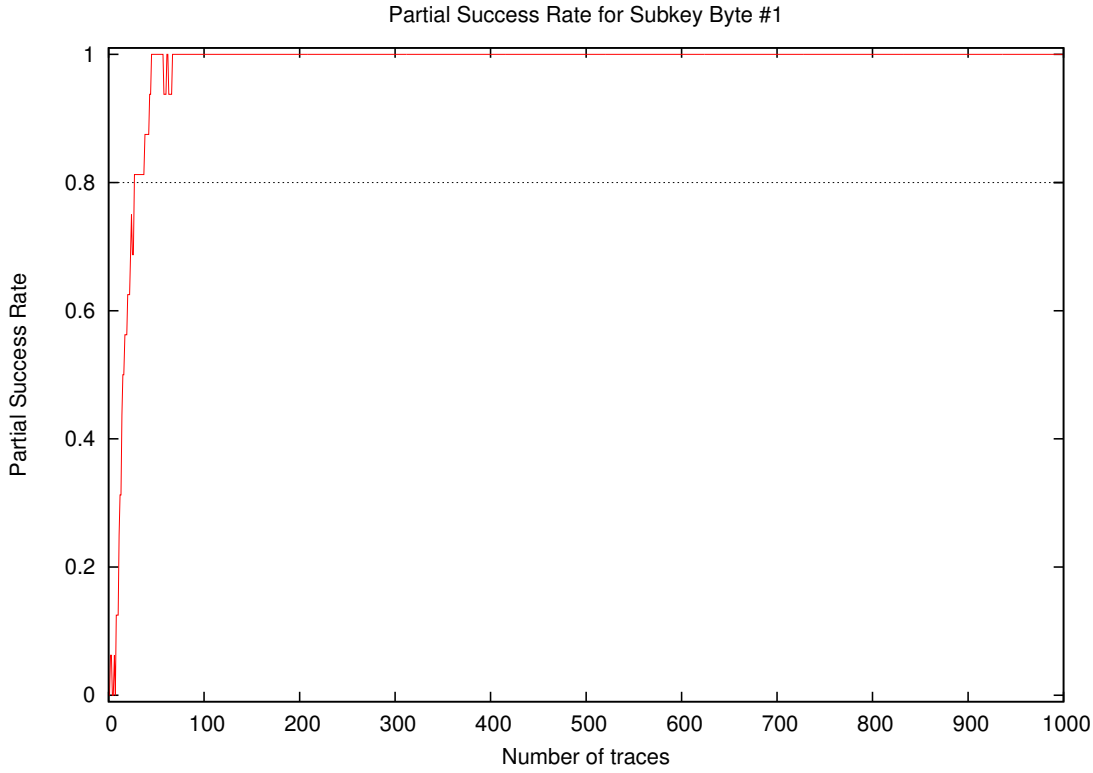
- **Date of evaluation:** August 2016

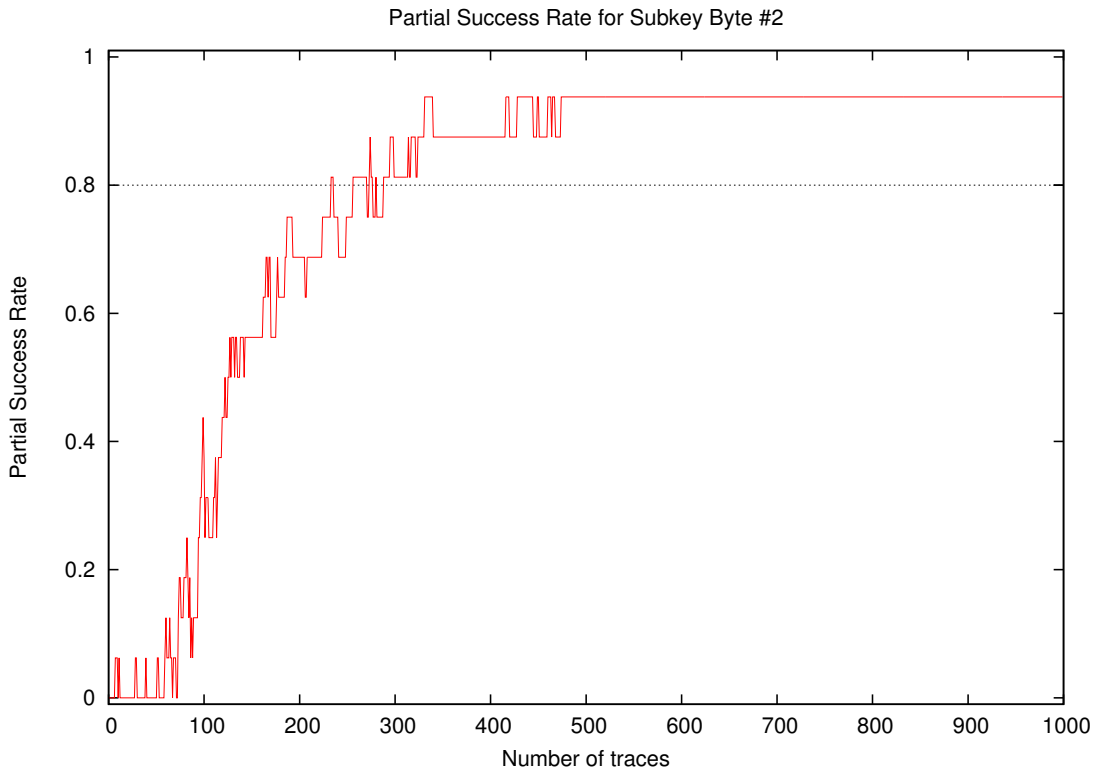
2 Global Success Rate

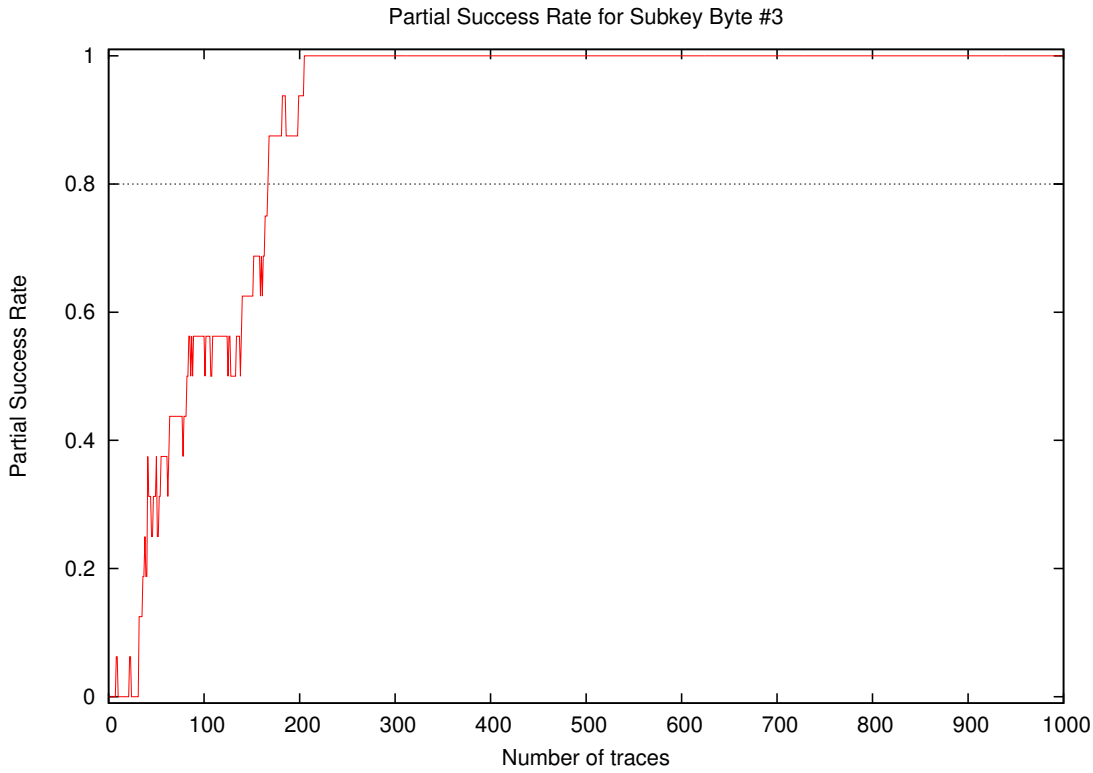


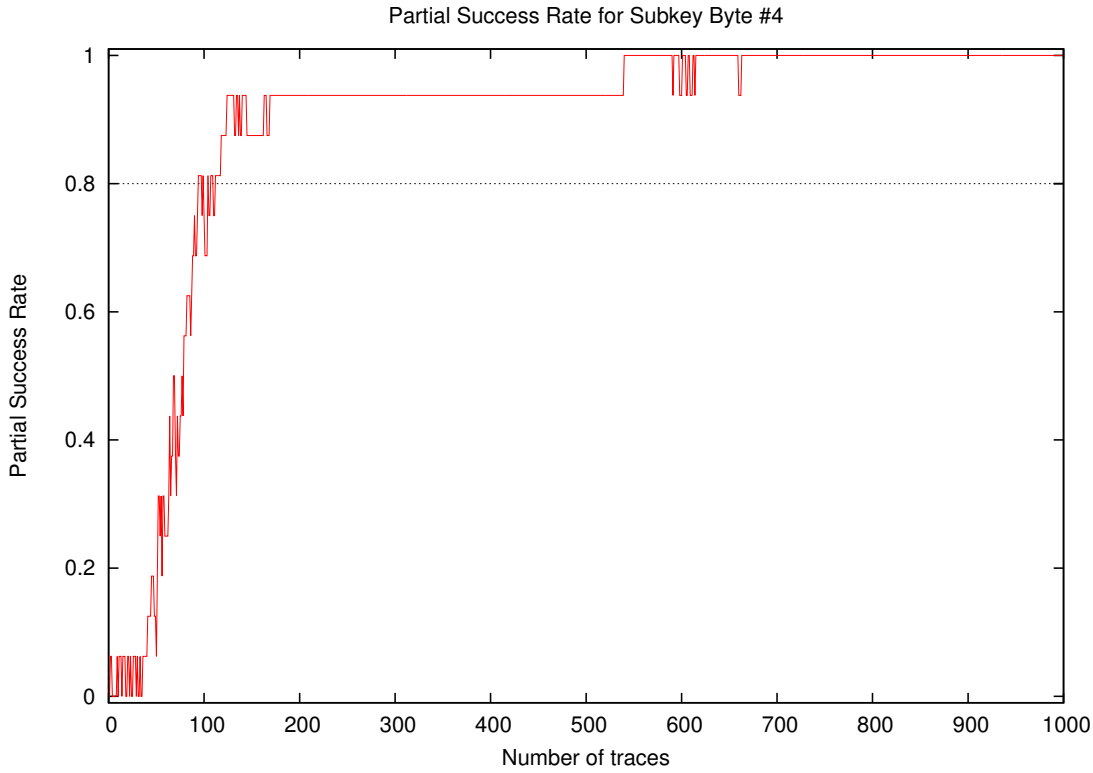
Number of traces	Global Success Rate
10	0.00
20	0.00
30	0.00
40	0.00
50	0.00
100	0.00
200	0.25
300	0.44
400	0.81
500	0.94
600	0.94
700	0.94
800	0.94
900	0.94
1000	0.94

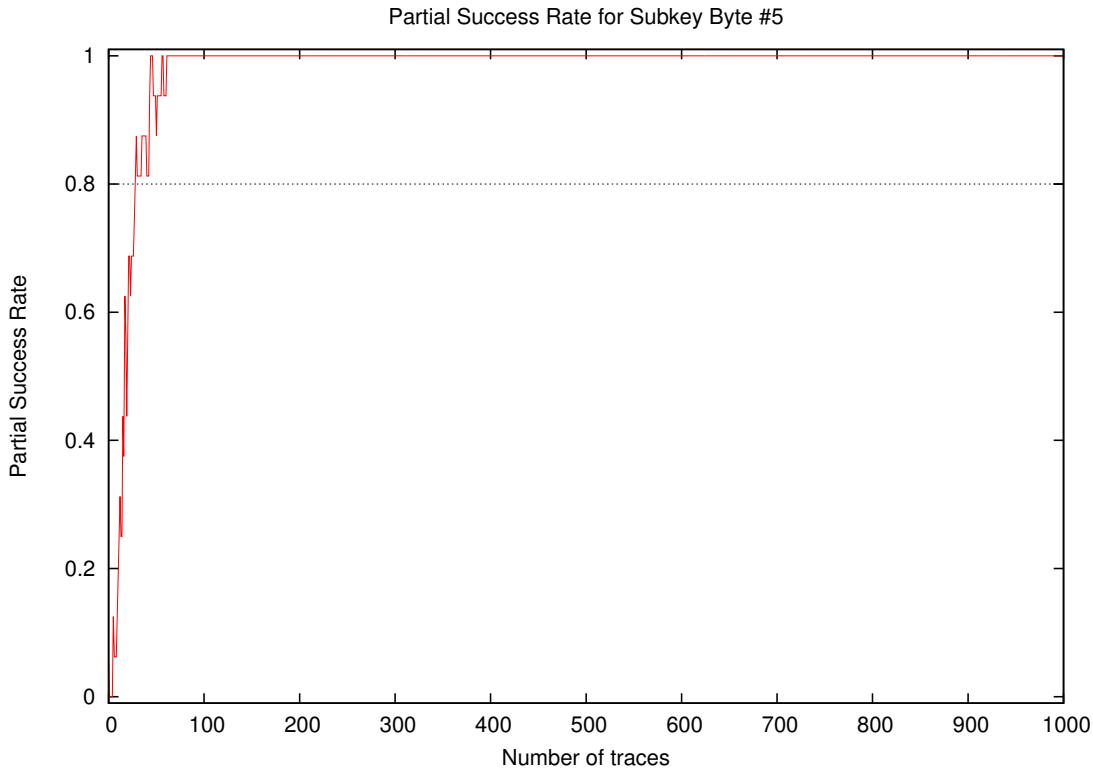
3 Partial Success Rate

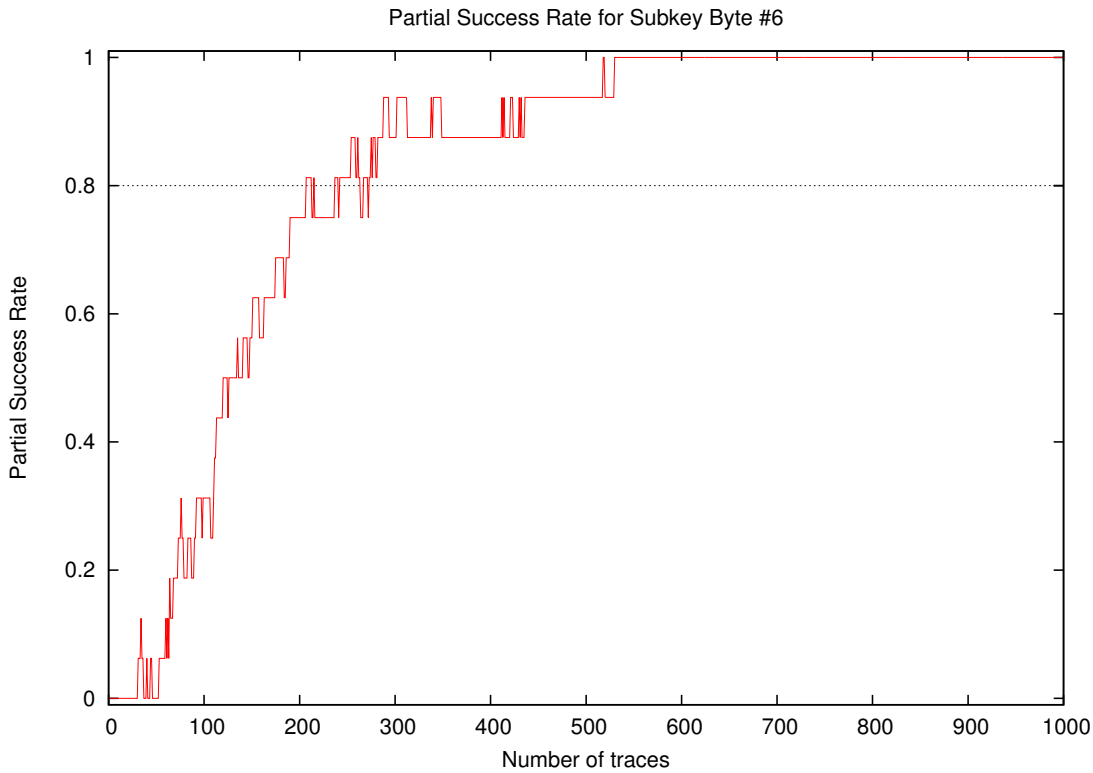


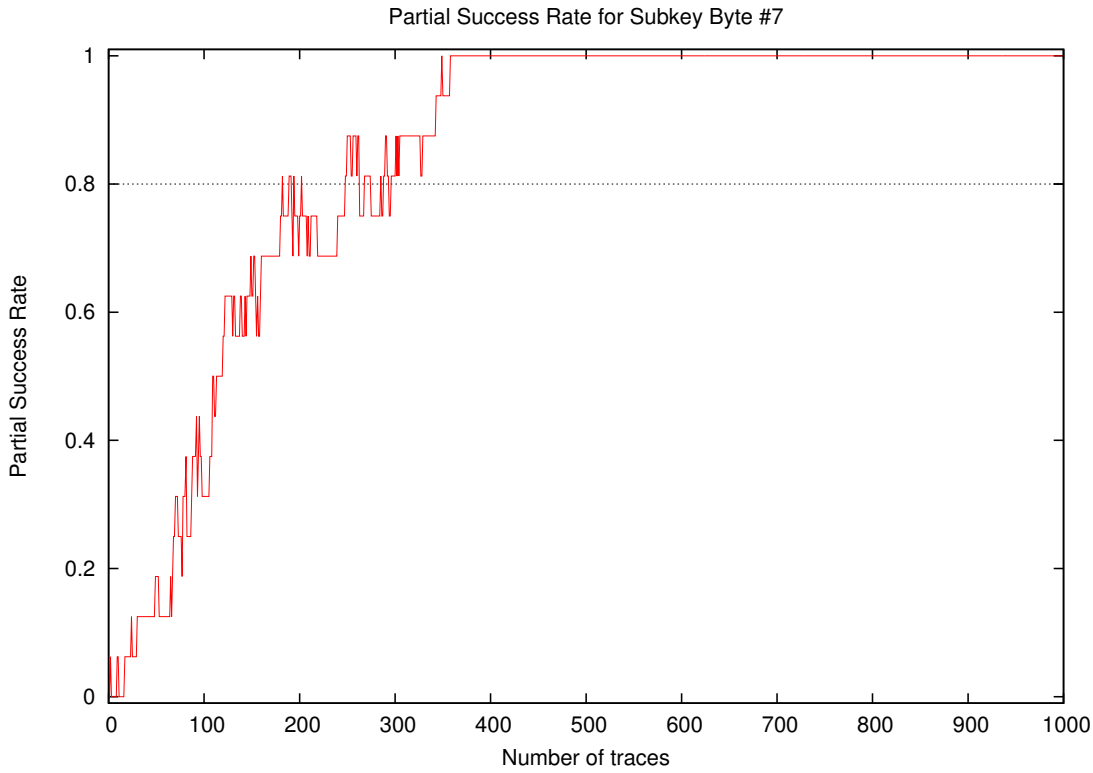


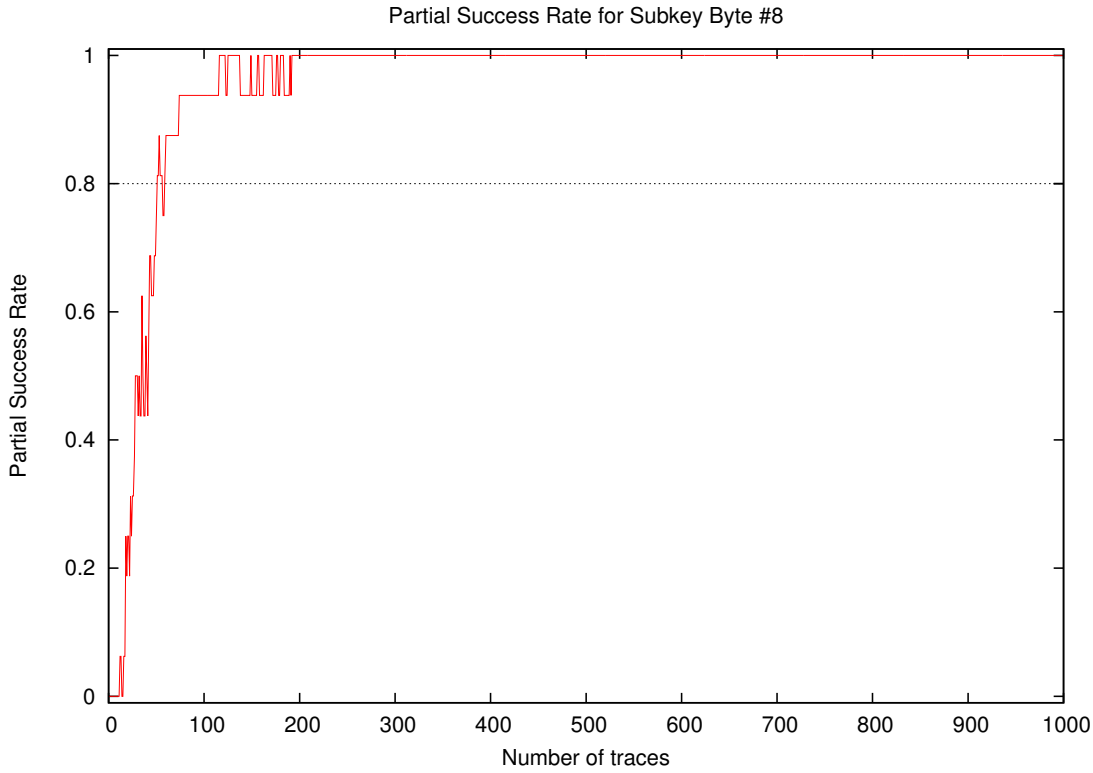

Partial Success Rate for Subkey Byte #3
Partial Success Rate
Number of traces
0
0.2
0.4
0.6
0.8
1
0
100
200
300
400
500
600
700
800
900
1000

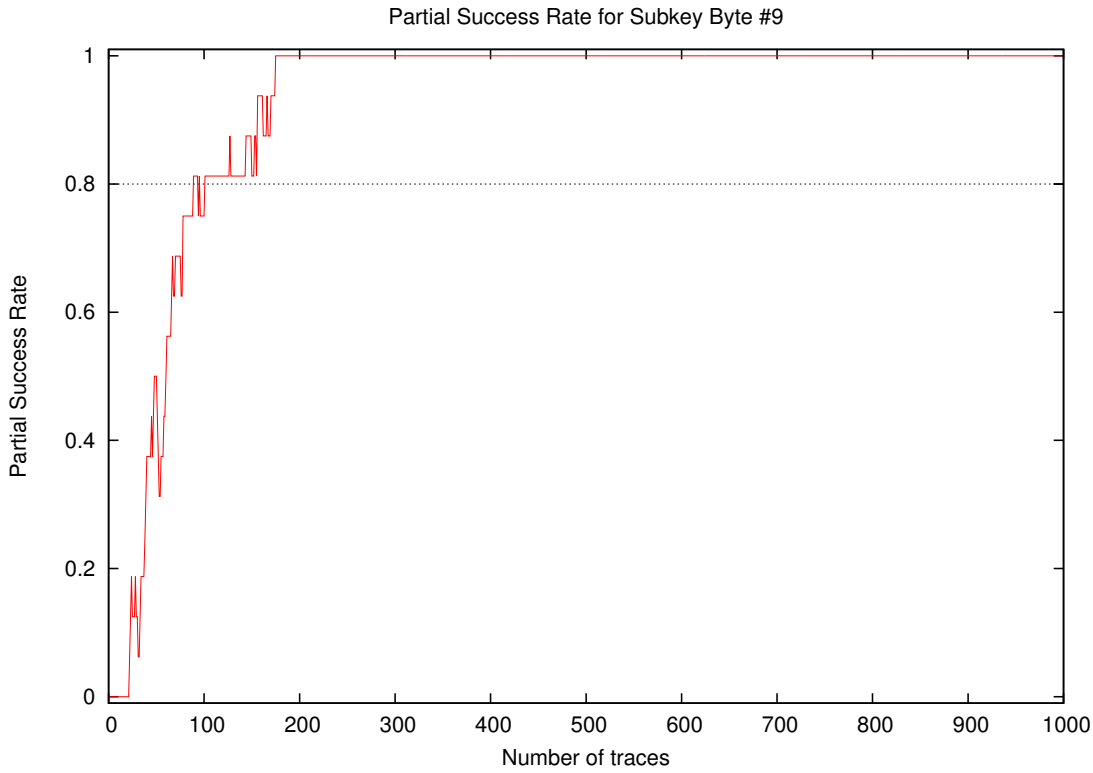

Partial Success Rate for Subkey Byte #4
Partial Success Rate
Number of traces
0
0.2
0.4
0.6
0.8
1
0
100
200
300
400
500
600
700
800
900
1000


Partial Success Rate for Subkey Byte #5
Partial Success Rate
Number of traces
0
0.2
0.4
0.6
0.8
1
0
100
200
300
400
500
600
700
800
900
1000


Partial Success Rate for Subkey Byte #6
Partial Success Rate
Number of traces
0
0.2
0.4
0.6
0.8
1
0
100
200
300
400
500
600
700
800
900
1000


Partial Success Rate for Subkey Byte #7
Partial Success Rate
Number of traces
0
0.2
0.4
0.6
0.8
1
0
100
200
300
400
500
600
700
800
900
1000


Partial Success Rate for Subkey Byte #8
Partial Success Rate
Number of traces
0
0.2
0.4
0.6
0.8
1
0
100
200
300
400
500
600
700
800
900
1000


Partial Success Rate for Subkey Byte #9
Partial Success Rate
Number of traces
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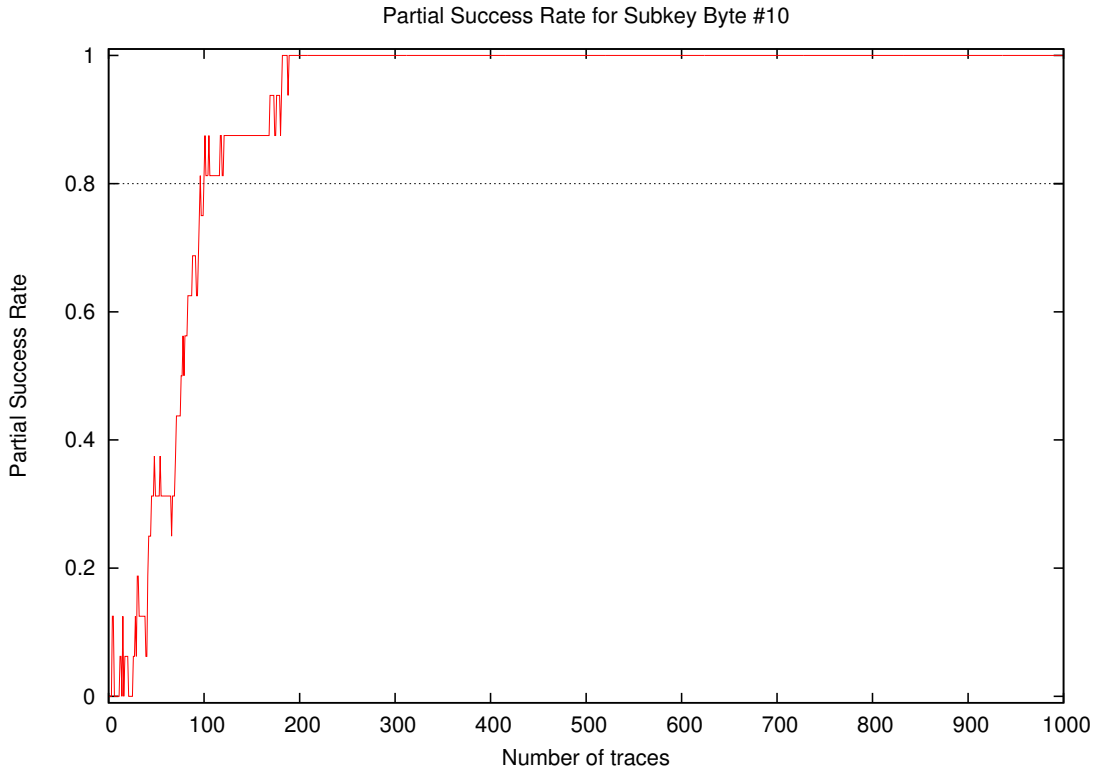
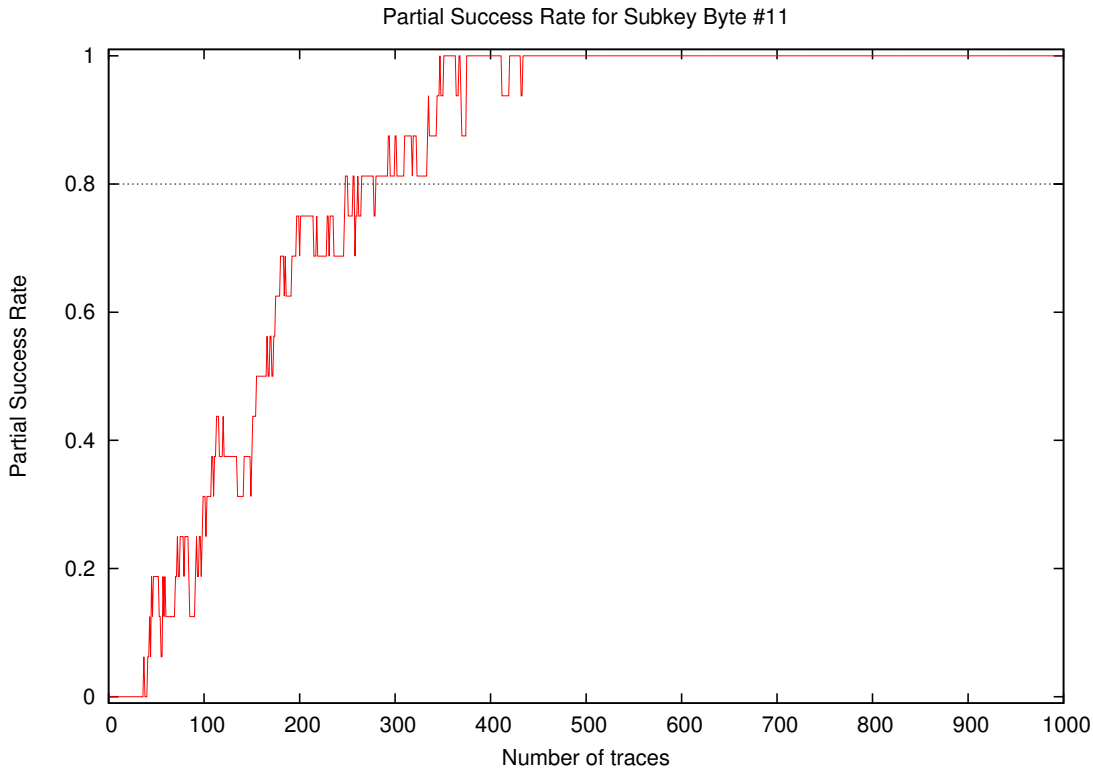
0.2
0.4
0.6
0.8
1
0
100
200
300
400
500
600
700
800
900
1000


Partial Success Rate for Subkey Byte #10
Partial Success Rate
Number of traces
0
0.2
0.4
0.6
0.8
1
0
100
200
300
400
500
600
700
800
900
1000


Partial Success Rate for Subkey Byte #11
Partial Success Rate
Number of traces
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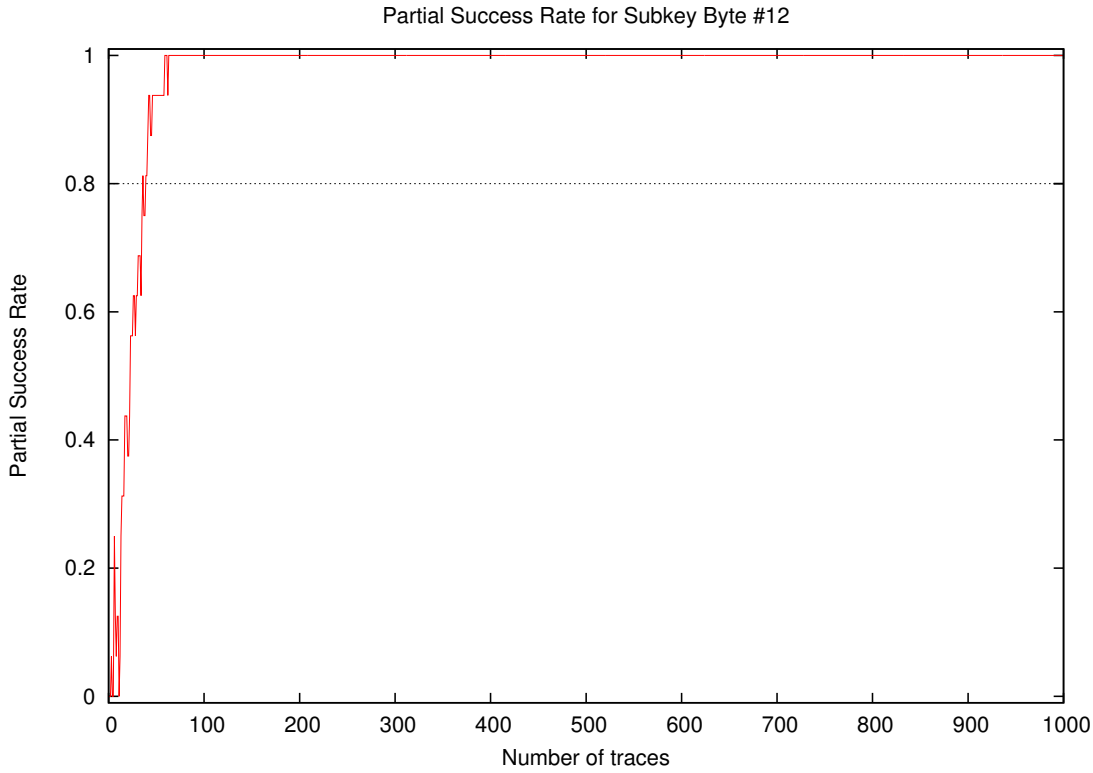
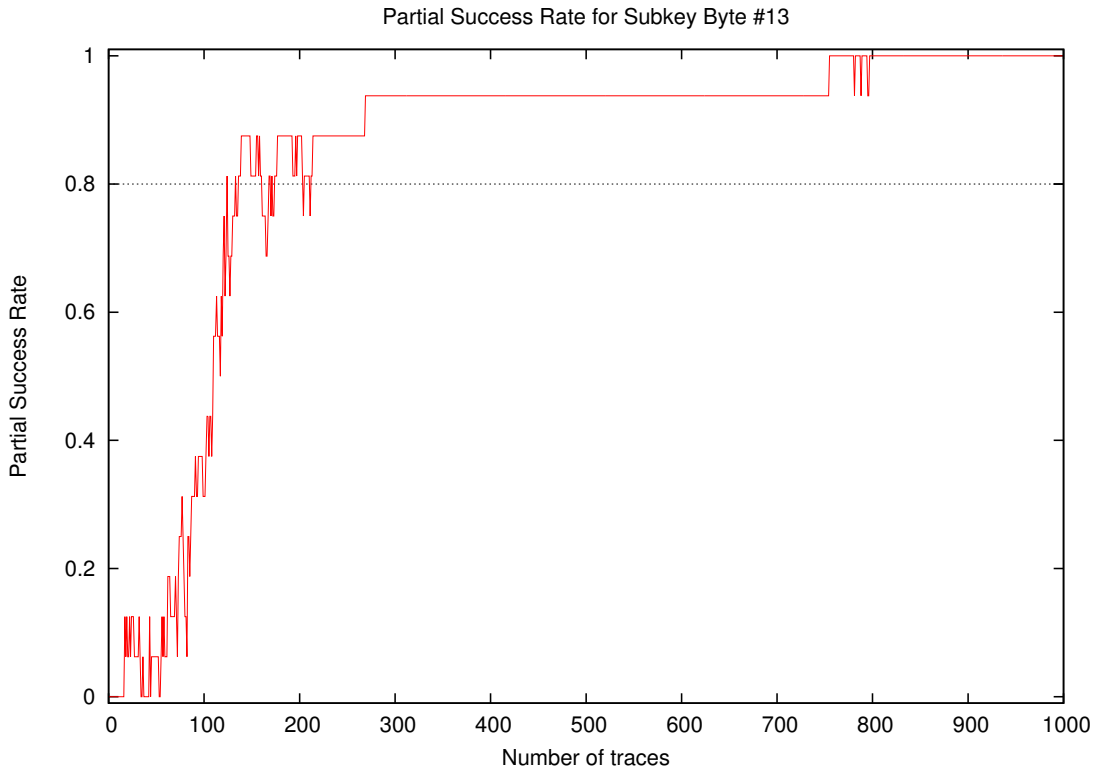
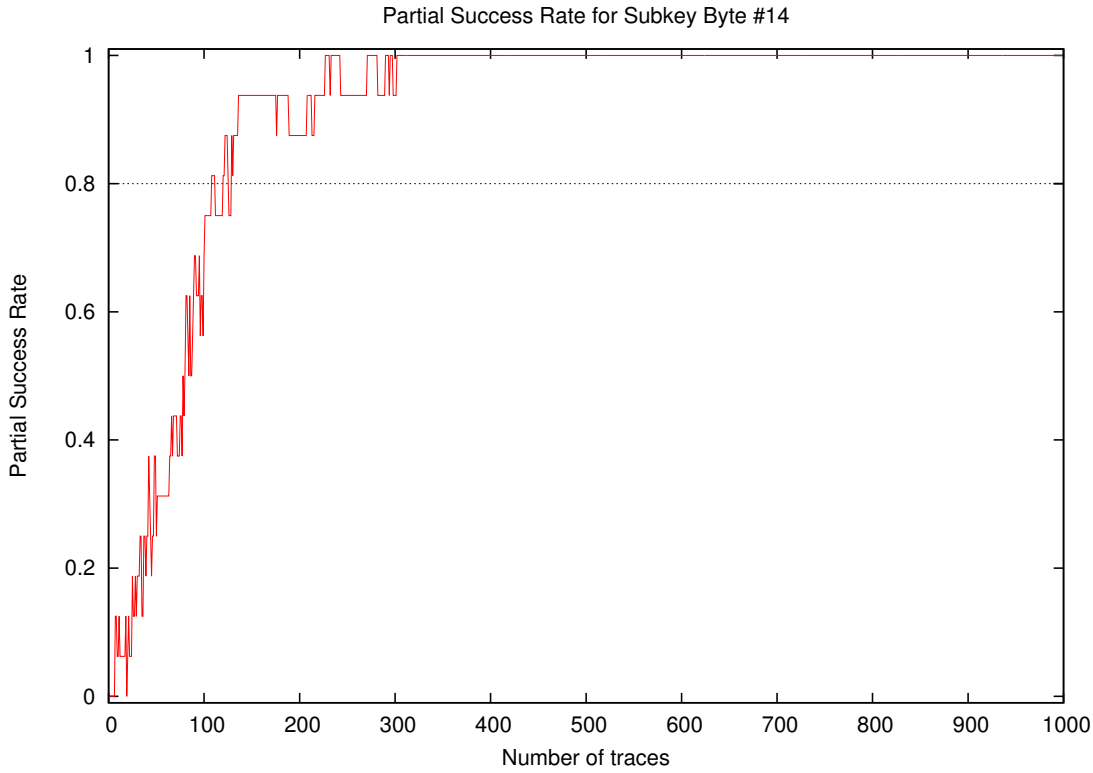
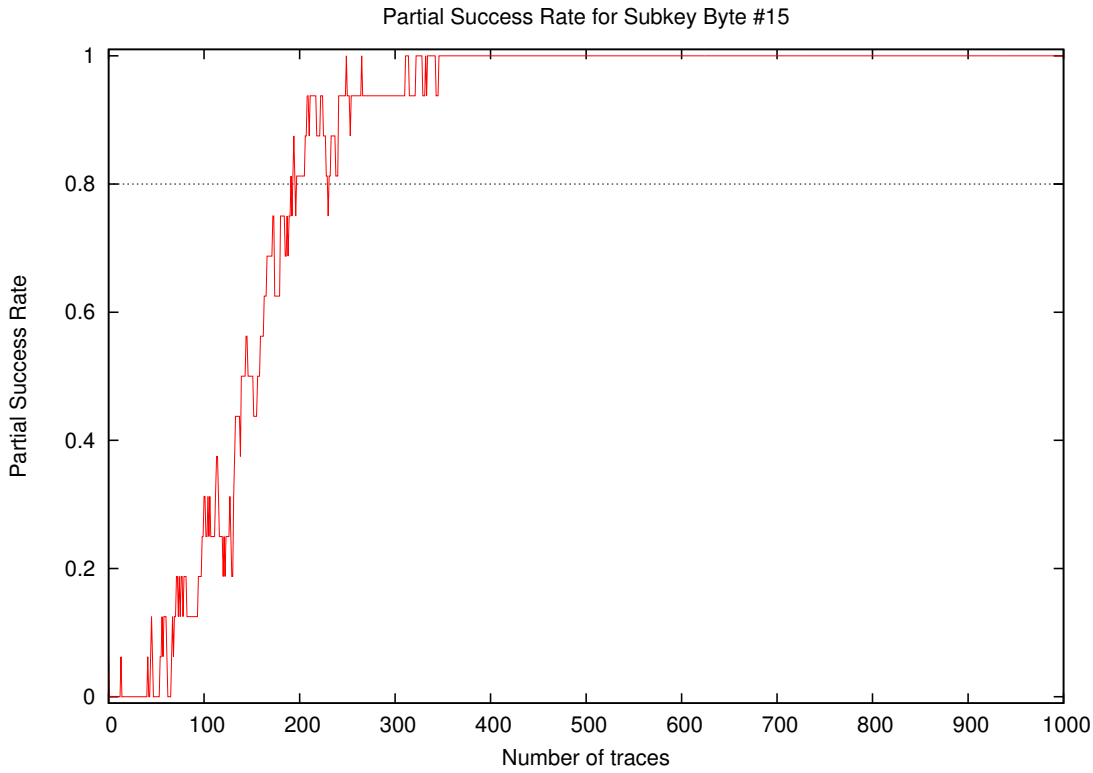
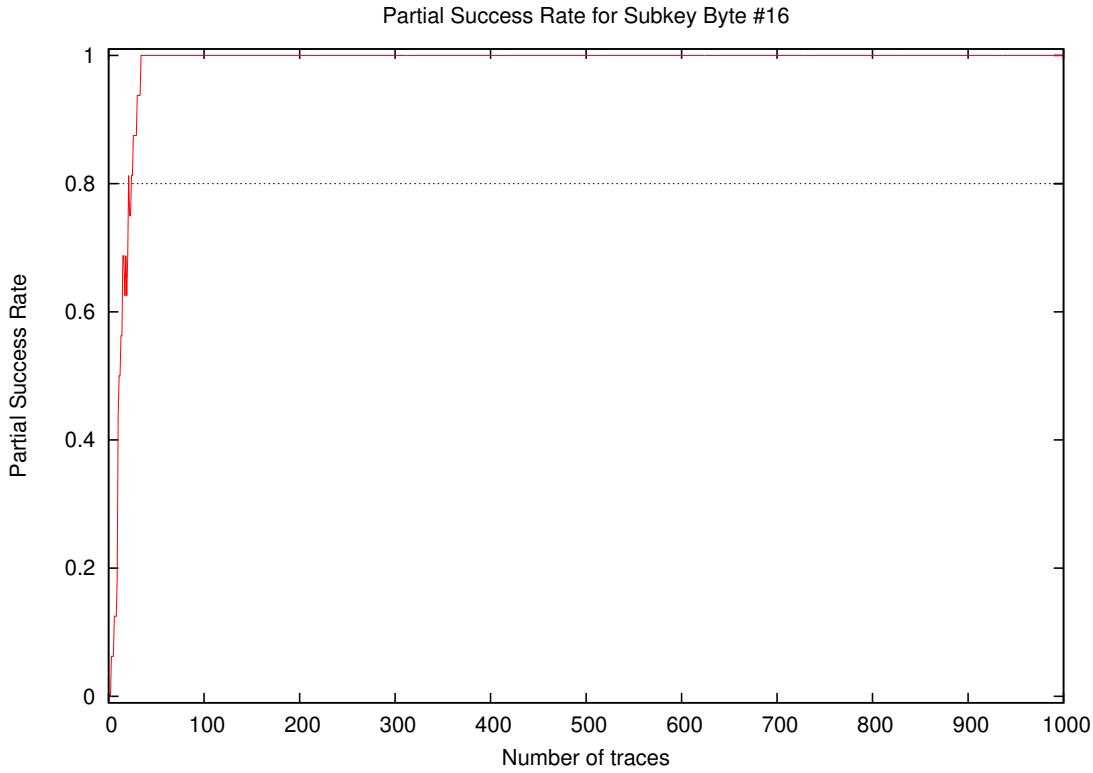
0.2
0.4
0.6
0.8
1
0
100
200
300
400
500
600
700
800
900
1000

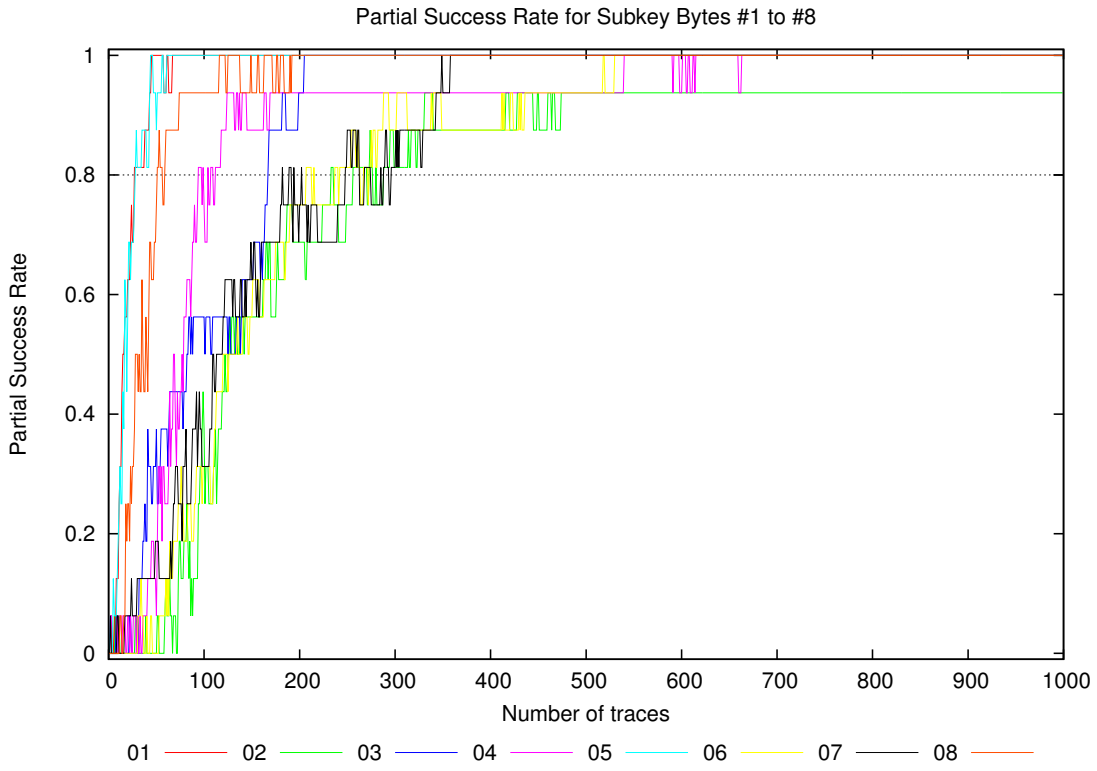

Partial Success Rate for Subkey Byte #12
Partial Success Rate
Number of traces
0
0.2
0.4
0.6
0.8
1
0
100
200
300
400
500
600
700
800
900
1000


Partial Success Rate for Subkey Byte #13
Partial Success Rate
Number of traces
0
0.2
0.4
0.6
0.8
1
0
100
200
300
400
500
600
700
800
900
1000


Partial Success Rate for Subkey Byte #14
Partial Success Rate
Number of traces
0
0.2
0.4
0.6
0.8
1
0
100
200
300
400
500
600
700
800
900
1000


Partial Success Rate for Subkey Byte #15
Partial Success Rate
Number of traces
0
0.2
0.4
0.6
0.8
1
0
100
200
300
400
500
600
700
800
900
1000


Partial Success Rate for Subkey Byte #16
Partial Success Rate
Number of traces
0
0.2
0.4
0.6
0.8
1
0
100
200
300
400
500
600
700
800
900
1000


Partial Success Rate for Subkey Bytes #1 to #8
Partial Success Rate
Number of traces
0
0.2
0.4
0.6
0.8
1
0
100
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300
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500
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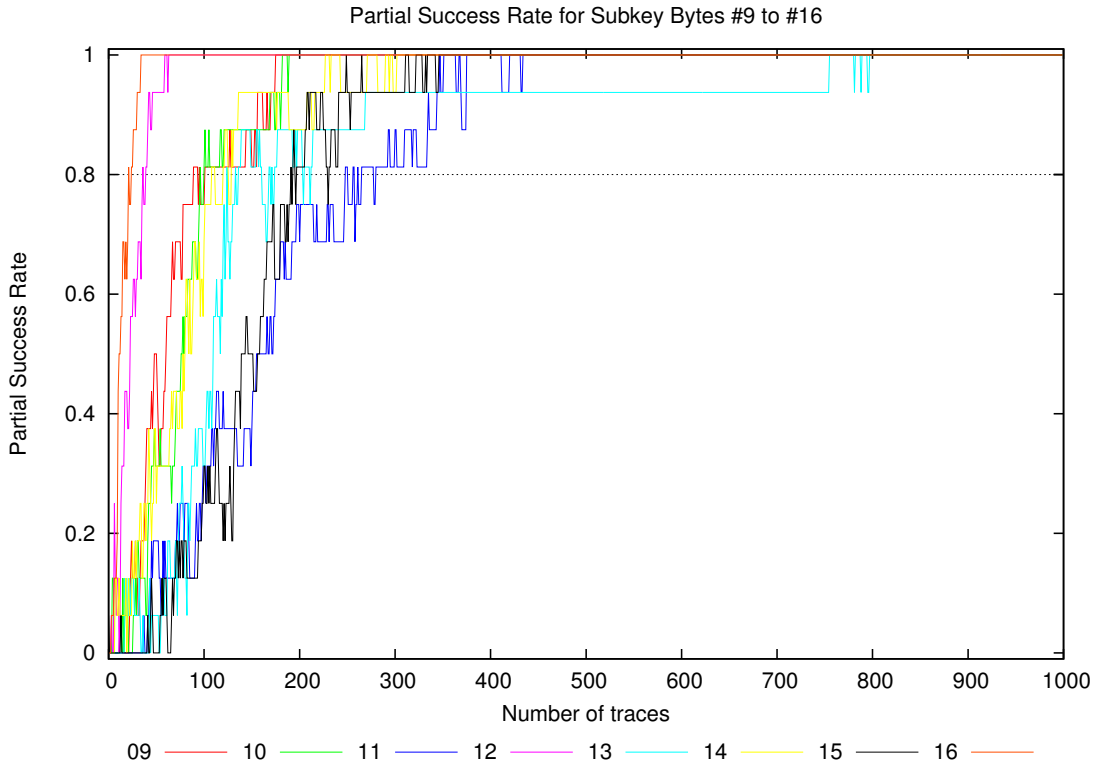
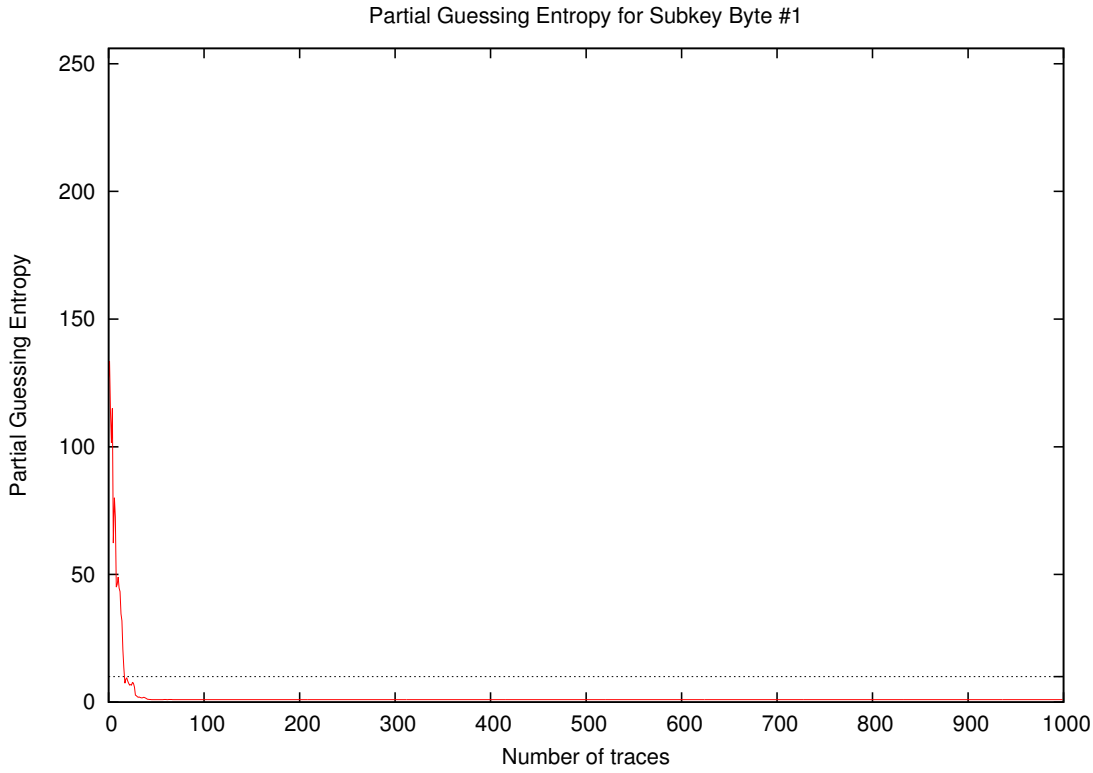
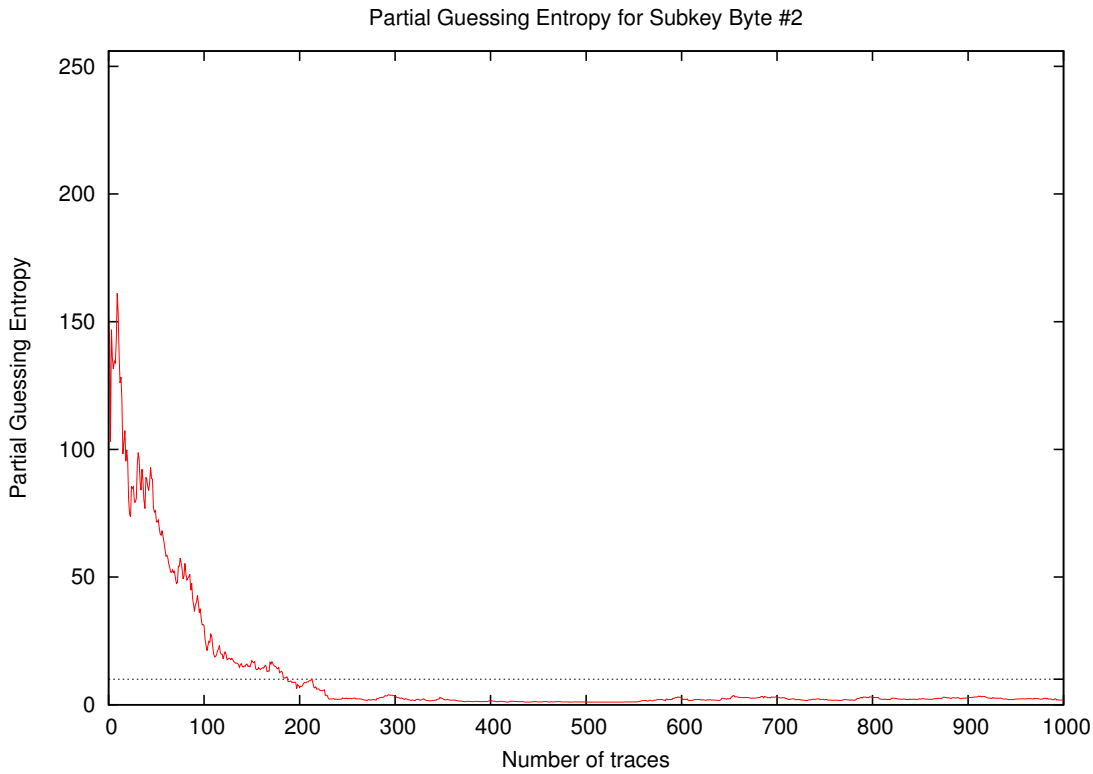
900
1000
01
02
03
04
05
06
07
08

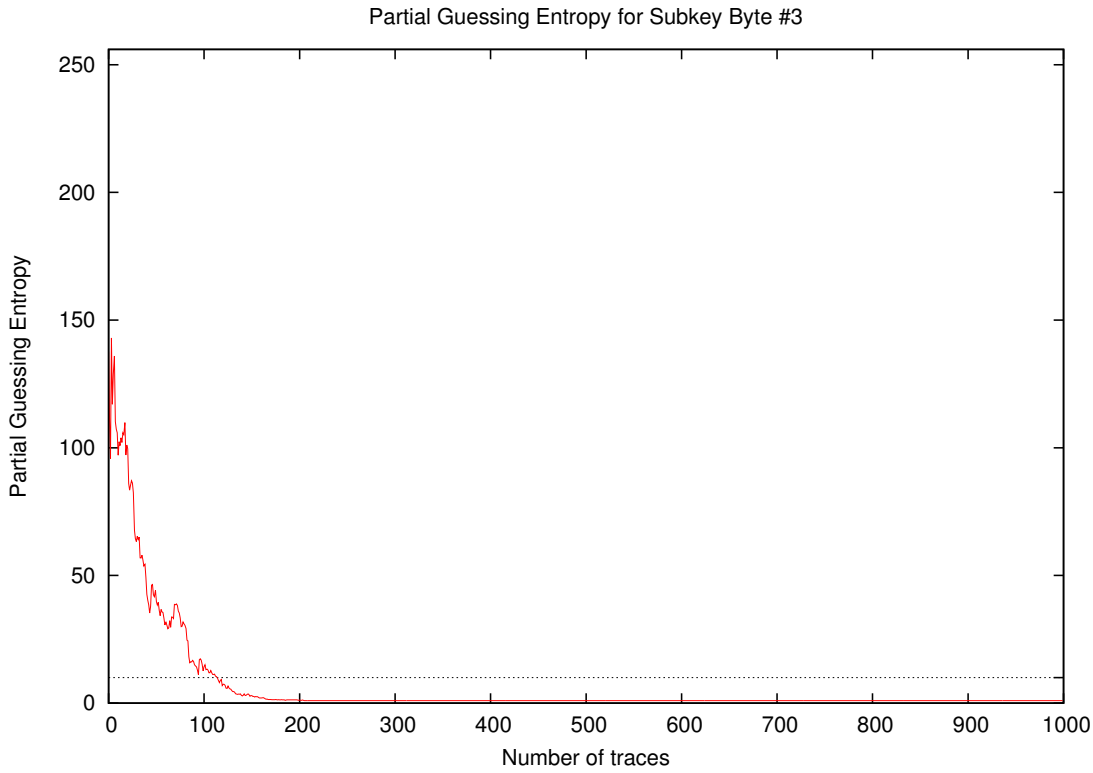

Partial Success Rate for Subkey Bytes #9 to #16
Partial Success Rate
Number of traces
0
0.2
0.4
0.6
0.8
1
0
100
200
300
400
500
600
700
800
900
1000
09
10
11
12
13
14
15
16

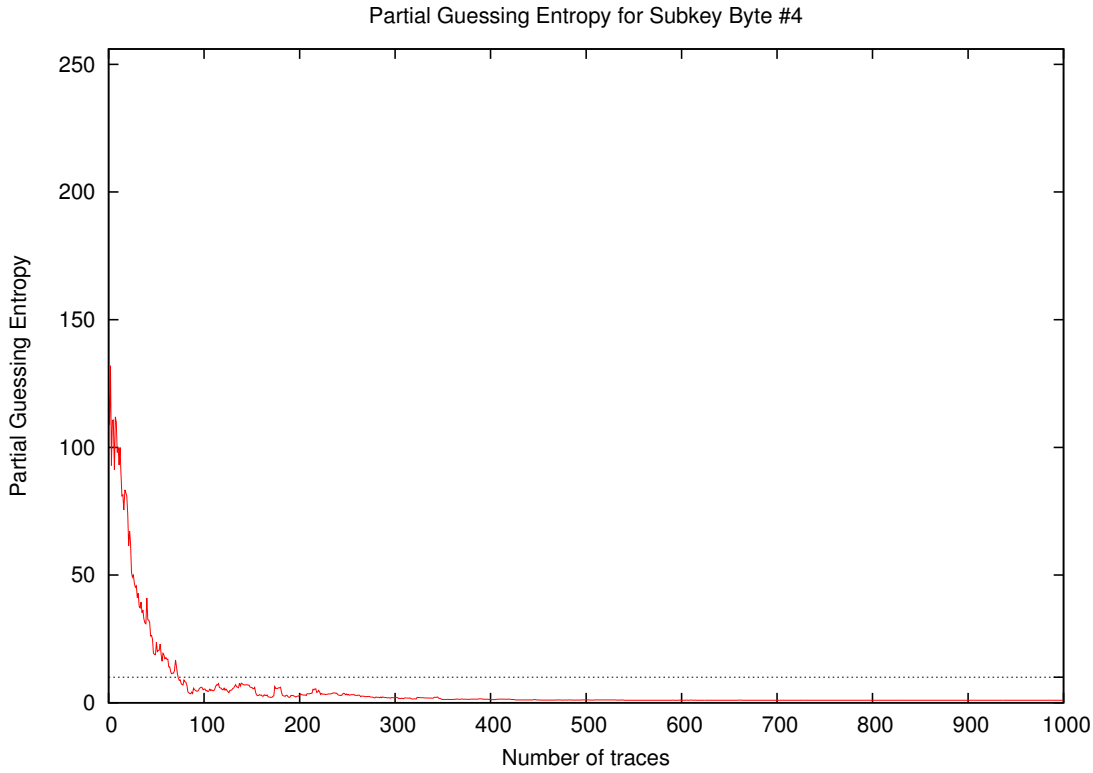
Traces	Partial Success Rate / Byte																Min	Max	Mean
	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16			
10	0.12	0.06	0.06	0.06	0.12	0.00	0.06	0.00	0.00	0.00	0.00	0.12	0.00	0.06	0.00	0.19	0.00	0.19	0.05
20	0.56	0.00	0.00	0.00	0.44	0.00	0.06	0.19	0.00	0.06	0.00	0.44	0.12	0.00	0.00	0.62	0.00	0.62	0.16
30	0.81	0.06	0.00	0.00	0.88	0.00	0.06	0.50	0.12	0.06	0.00	0.62	0.06	0.12	0.00	0.88	0.00	0.88	0.26
40	0.88	0.06	0.19	0.06	0.88	0.00	0.12	0.56	0.31	0.06	0.00	0.81	0.00	0.19	0.00	1.00	0.00	1.00	0.32
50	1.00	0.00	0.31	0.12	0.94	0.00	0.19	0.69	0.50	0.31	0.19	0.94	0.06	0.38	0.00	1.00	0.00	1.00	0.41
100	1.00	0.44	0.56	0.81	1.00	0.31	0.31	0.94	0.75	0.75	0.31	1.00	0.31	0.56	0.25	1.00	0.25	1.00	0.64
200	1.00	0.69	0.94	0.94	1.00	0.75	0.69	1.00	1.00	1.00	0.75	1.00	0.88	0.88	0.81	1.00	0.69	1.00	0.89
300	1.00	0.81	1.00	0.94	1.00	0.88	0.81	1.00	1.00	1.00	0.81	1.00	0.94	0.94	0.94	1.00	0.81	1.00	0.94
400	1.00	0.88	1.00	0.94	1.00	0.88	1.00	1.00	1.00	1.00	1.00	1.00	0.94	1.00	1.00	1.00	0.88	1.00	0.98
500	1.00	0.94	1.00	0.94	1.00	0.94	1.00	1.00	1.00	1.00	1.00	1.00	0.94	1.00	1.00	1.00	0.94	1.00	0.98
600	1.00	0.94	1.00	0.94	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.94	1.00	1.00	1.00	0.94	1.00	0.99
700	1.00	0.94	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.94	1.00	1.00	1.00	0.94	1.00	0.99
800	1.00	0.94	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.94	1.00	1.00
900	1.00	0.94	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.94	1.00	1.00
1000	1.00	0.94	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.94	1.00	1.00

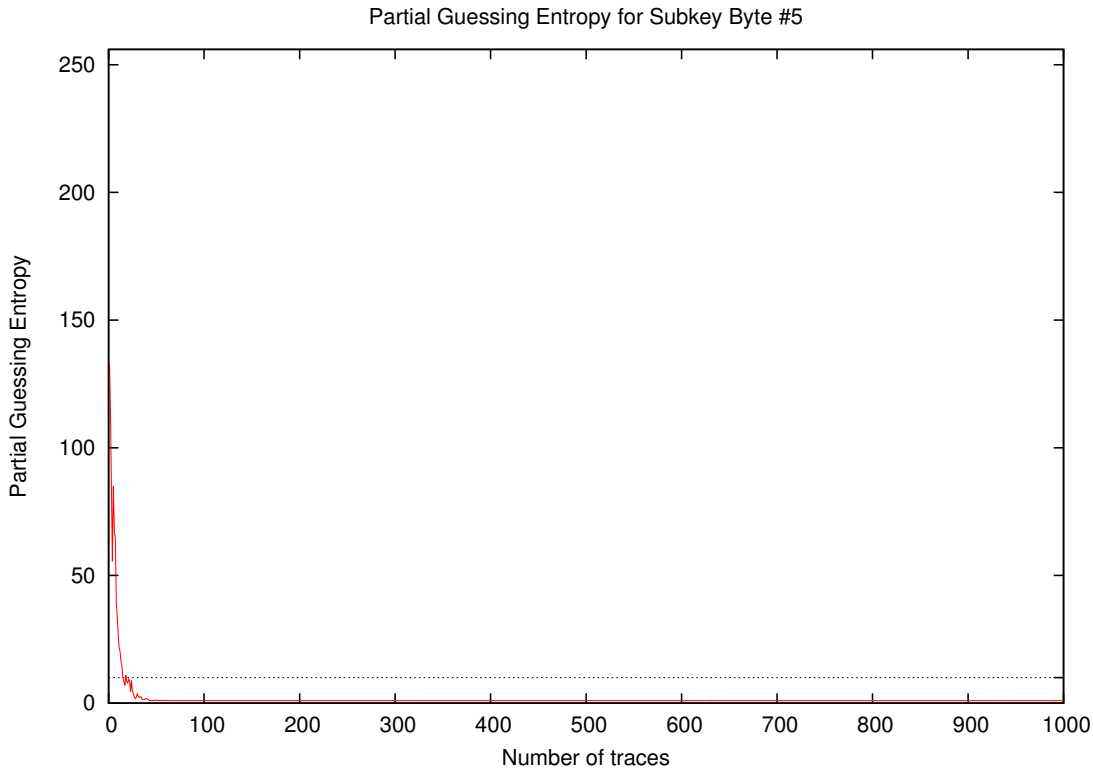
4 Partial Guessing Entropy






Partial Guessing Entropy for Subkey Byte #3
Partial Guessing Entropy
Number of traces
0
50
100
150
200
250
0
100
200
300
400
500
600
700
800
900
1000


Partial Guessing Entropy for Subkey Byte #4
Partial Guessing Entropy
Number of traces
0
50
100
150
200
250
0
100
200
300
400
500
600
700
800
900
1000


Partial Guessing Entropy for Subkey Byte #5
Partial Guessing Entropy
Number of traces
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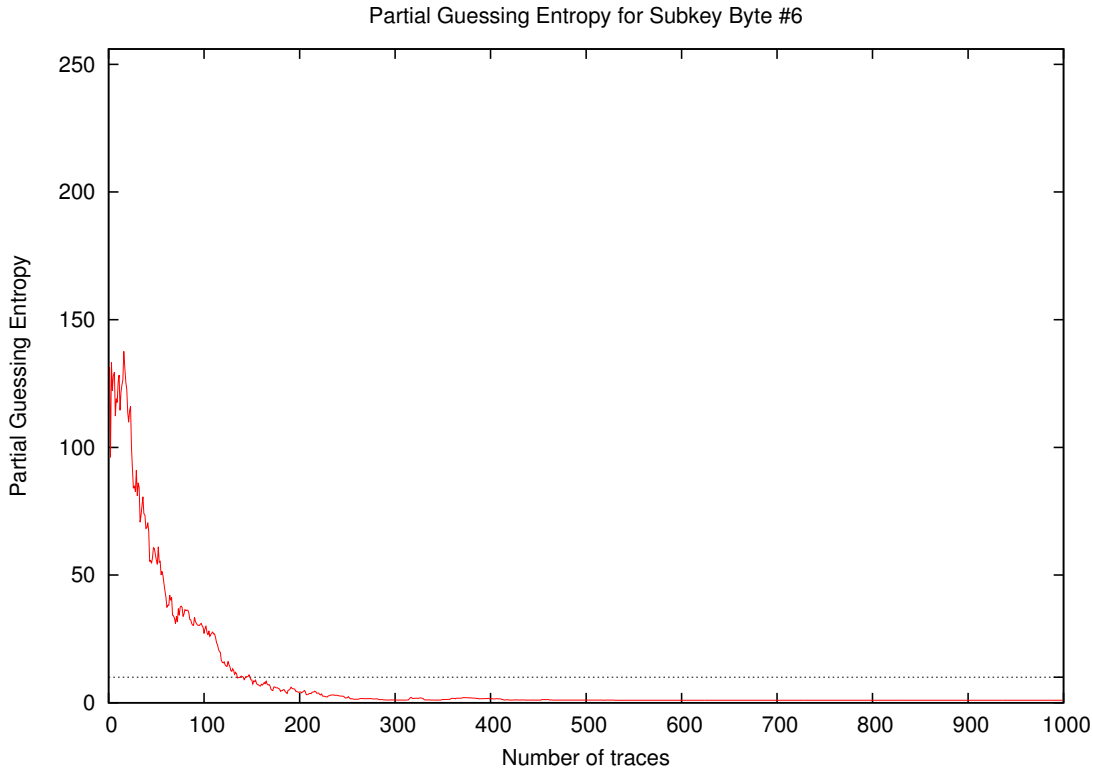
100
150
200
250
0
100
200
300
400
500
600
700
800
900
1000


Partial Guessing Entropy for Subkey Byte #6
Partial Guessing Entropy
Number of traces
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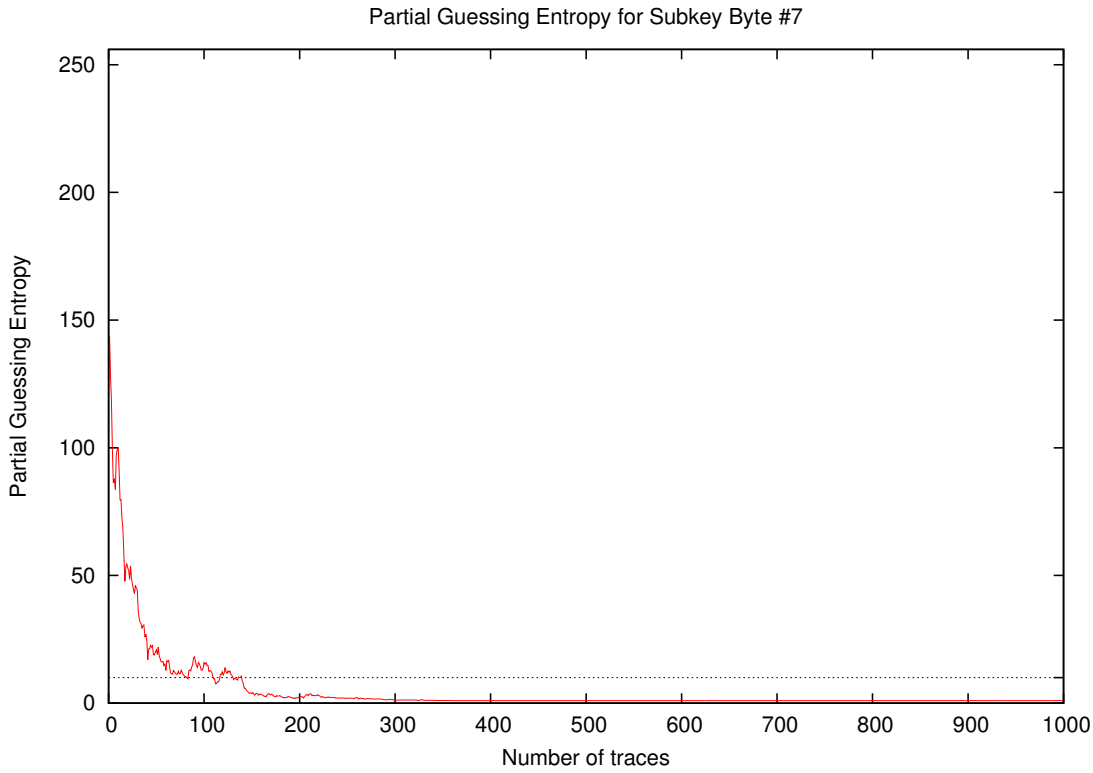
100
150
200
250
0
100
200
300
400
500
600
700
800
900
1000


Partial Guessing Entropy for Subkey Byte #7
Partial Guessing Entropy
Number of traces
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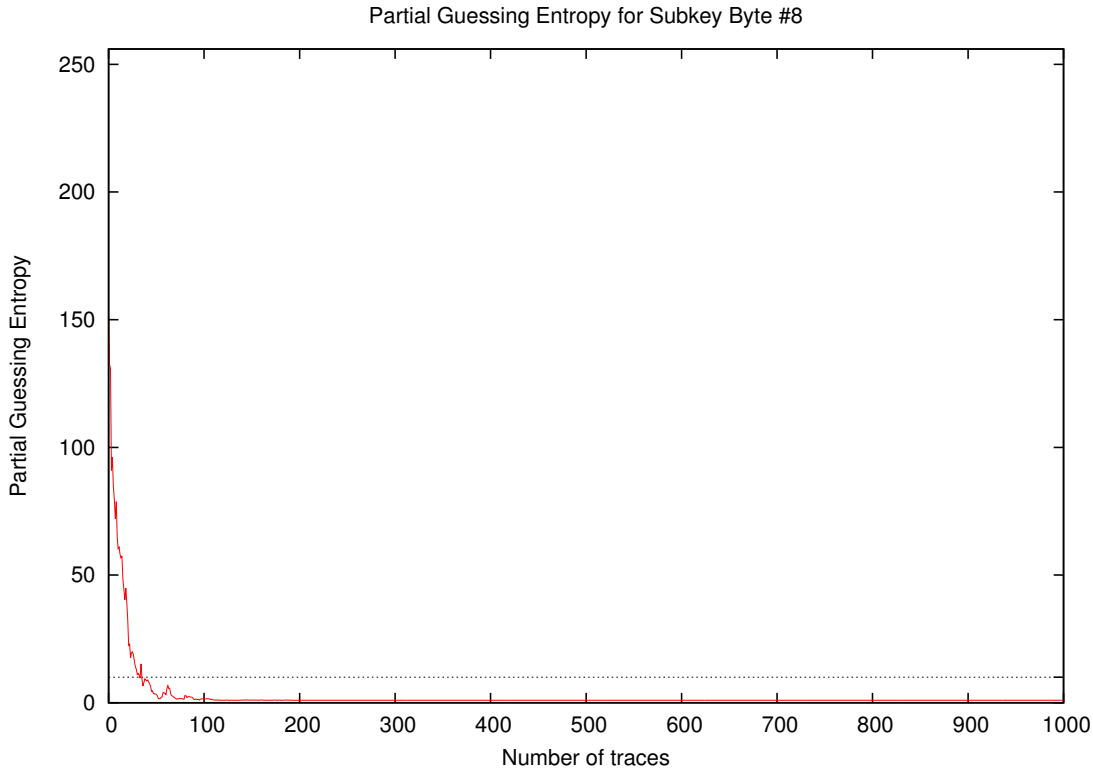
100
150
200
250
0
100
200
300
400
500
600
700
800
900
1000


Partial Guessing Entropy for Subkey Byte #8
Partial Guessing Entropy
Number of traces
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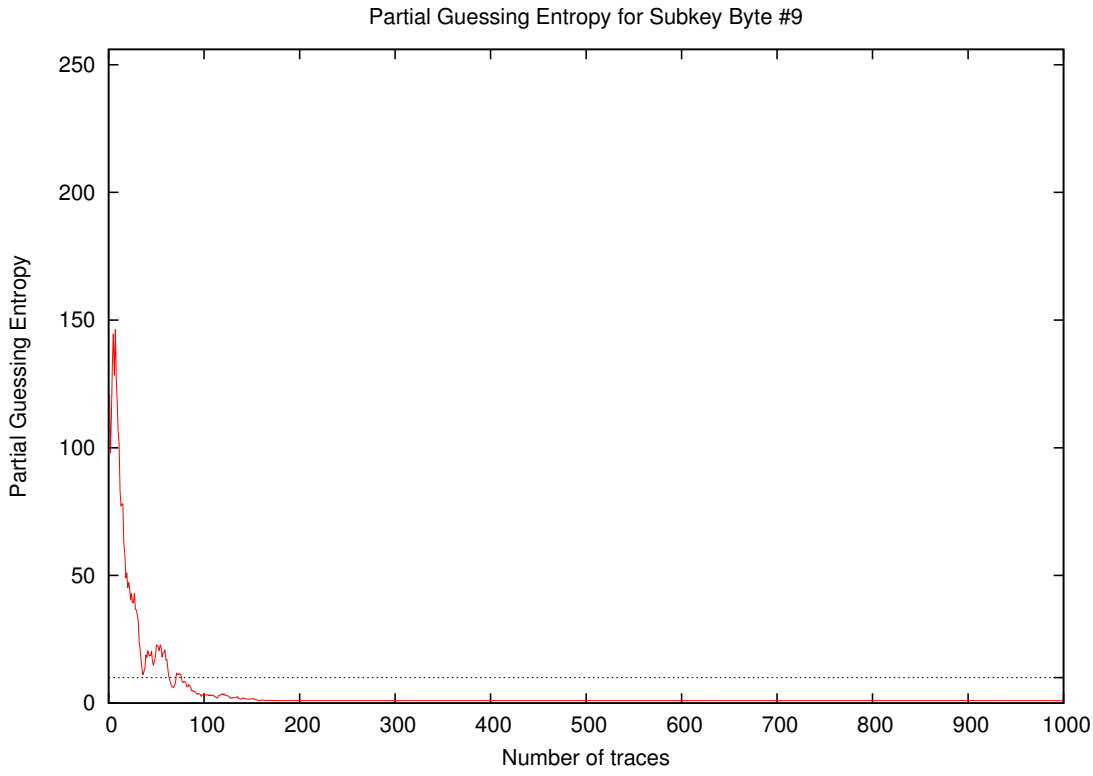
100
150
200
250
0
100
200
300
400
500
600
700
800
900
1000


Partial Guessing Entropy for Subkey Byte #9
Partial Guessing Entropy
Number of traces
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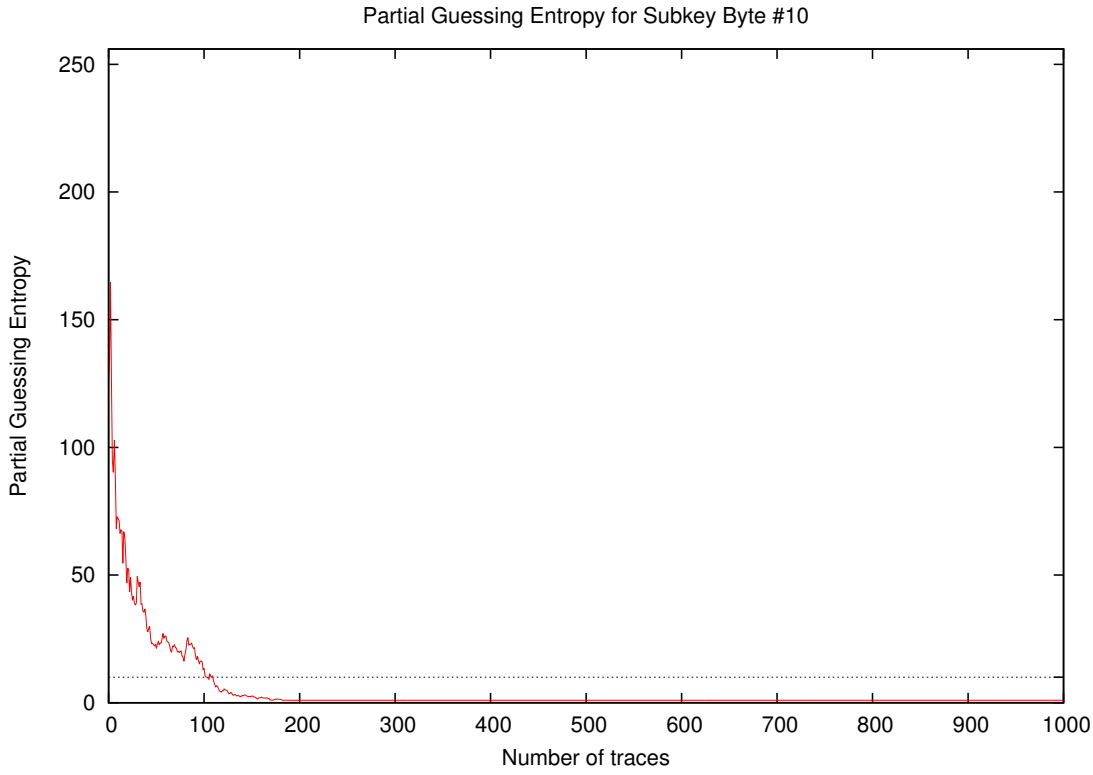
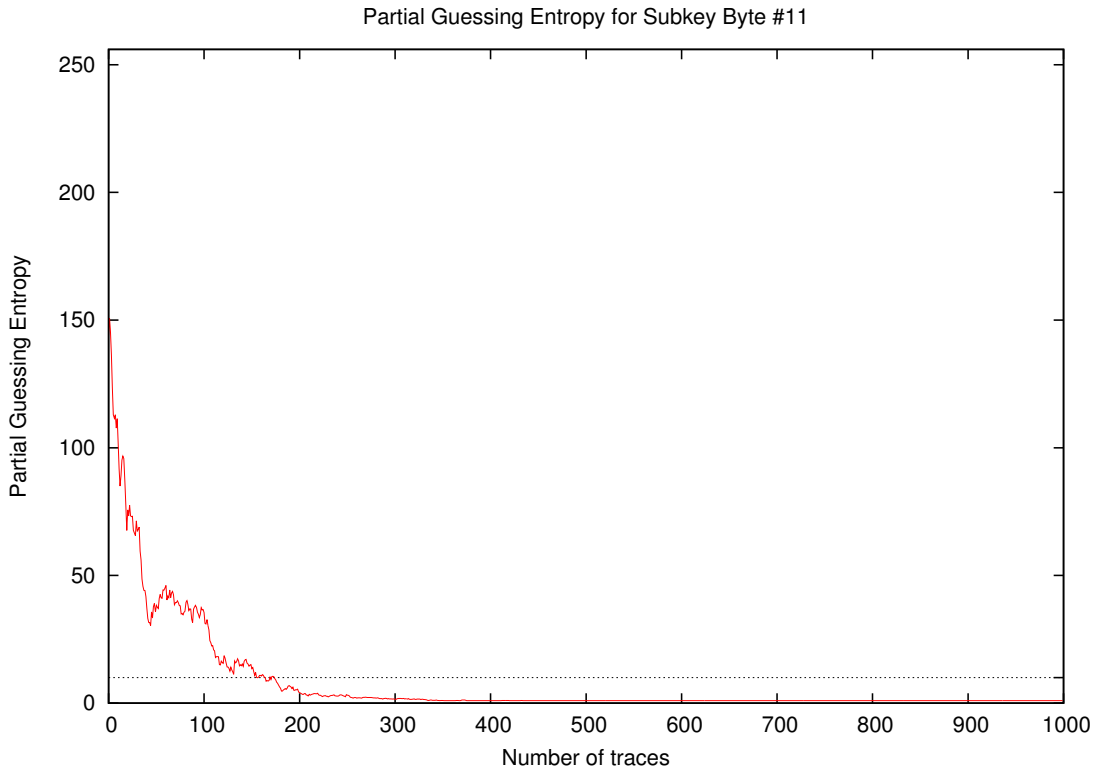
100
150
200
250
0
100
200
300
400
500
600
700
800
900
1000


Partial Guessing Entropy for Subkey Byte #10
Partial Guessing Entropy
Number of traces
0
50
100
150
200
250
0
100
200
300
400
500
600
700
800
900
1000


Partial Guessing Entropy for Subkey Byte #11
Partial Guessing Entropy
Number of traces
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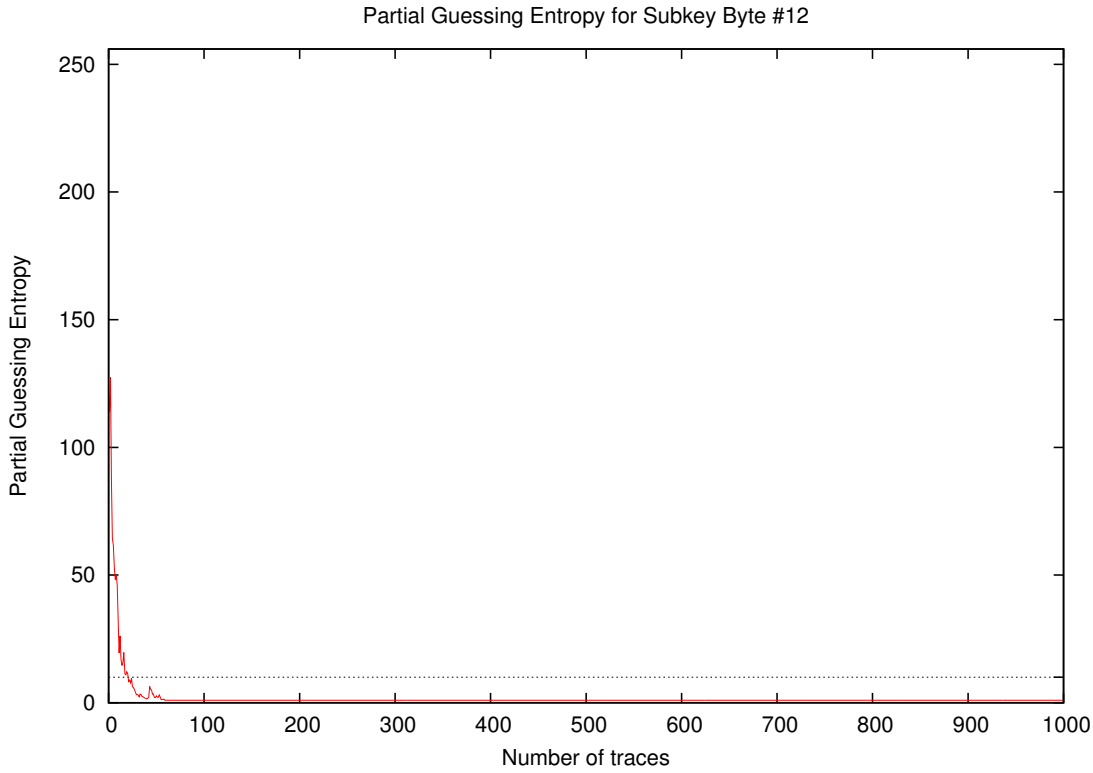
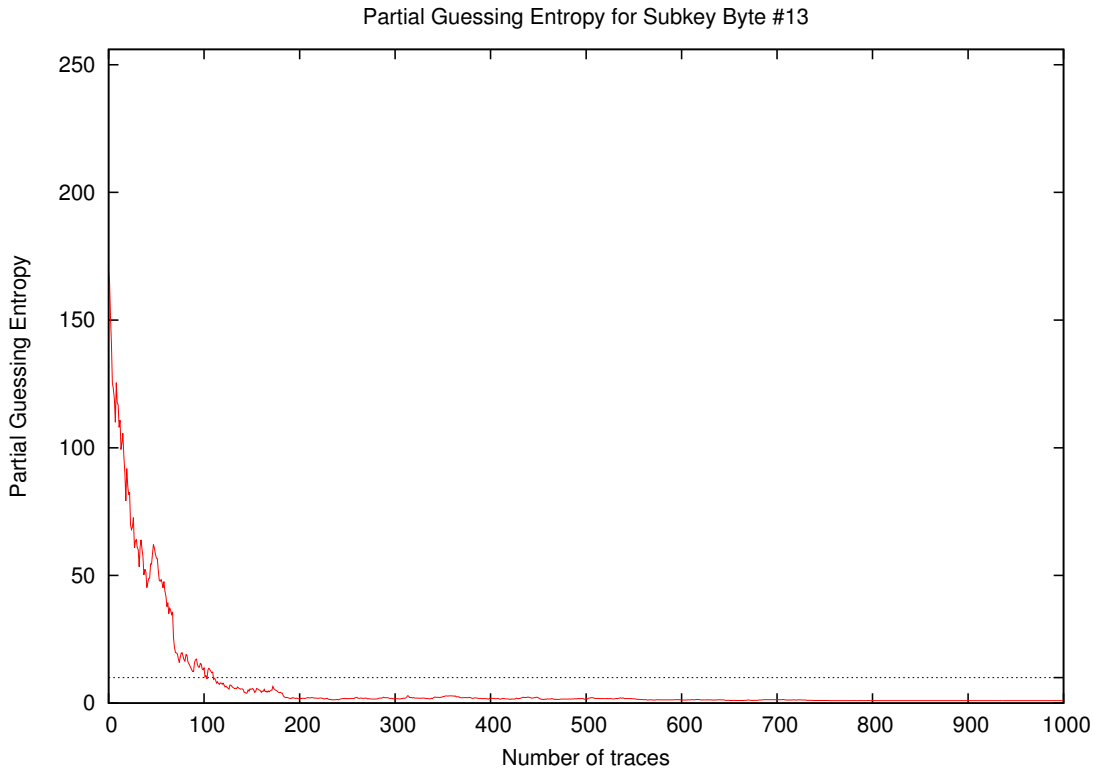
100
150
200
250
0
100
200
300
400
500
600
700
800
900
1000


Partial Guessing Entropy for Subkey Byte #12
Partial Guessing Entropy
Number of traces
0
50
100
150
200
250
0
100
200
300
400
500
600
700
800
900
1000


Partial Guessing Entropy for Subkey Byte #13
Partial Guessing Entropy
Number of traces
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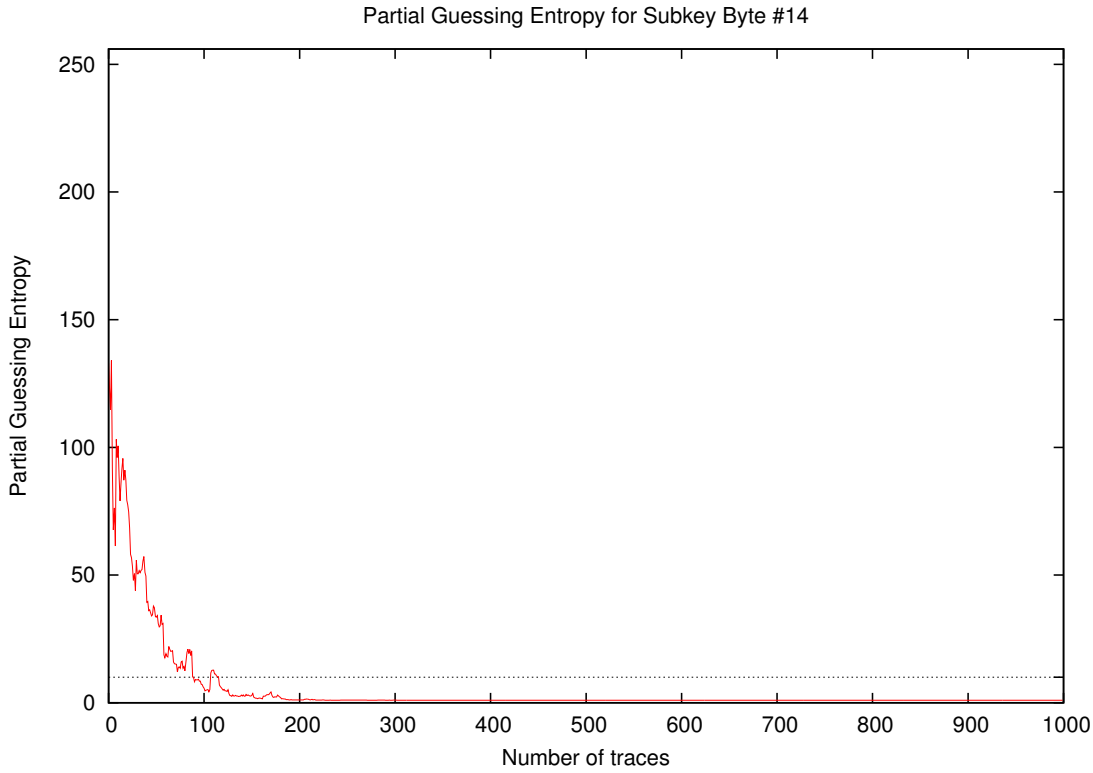
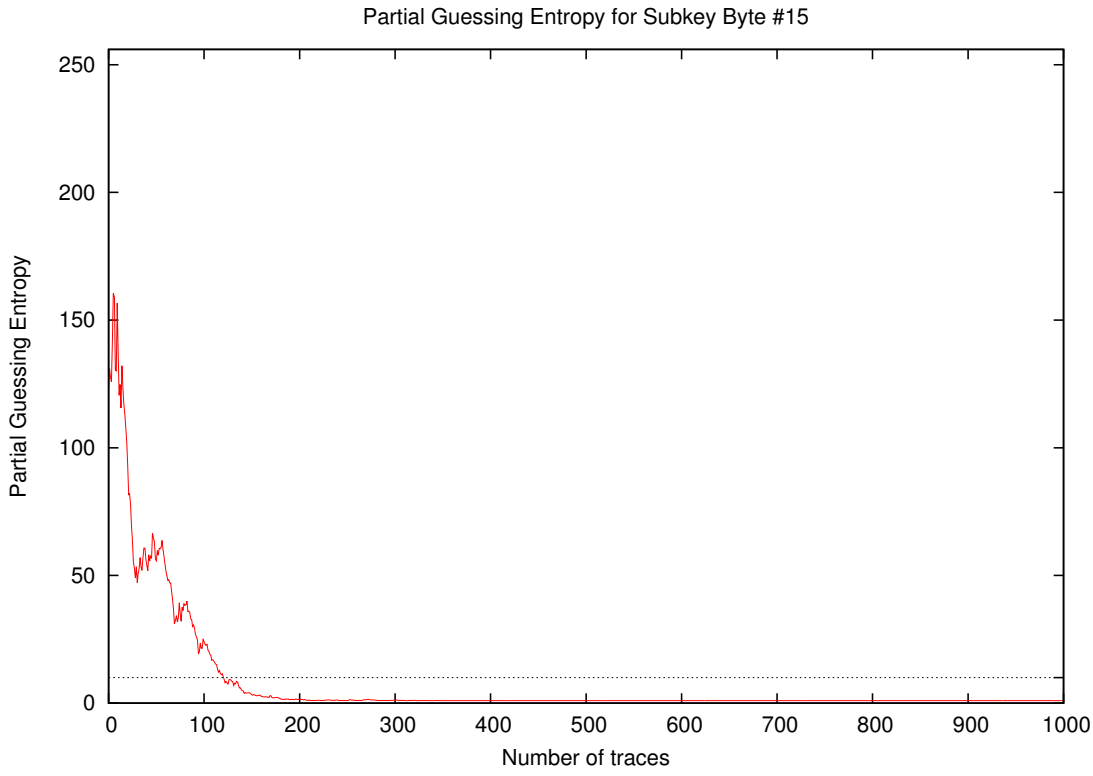
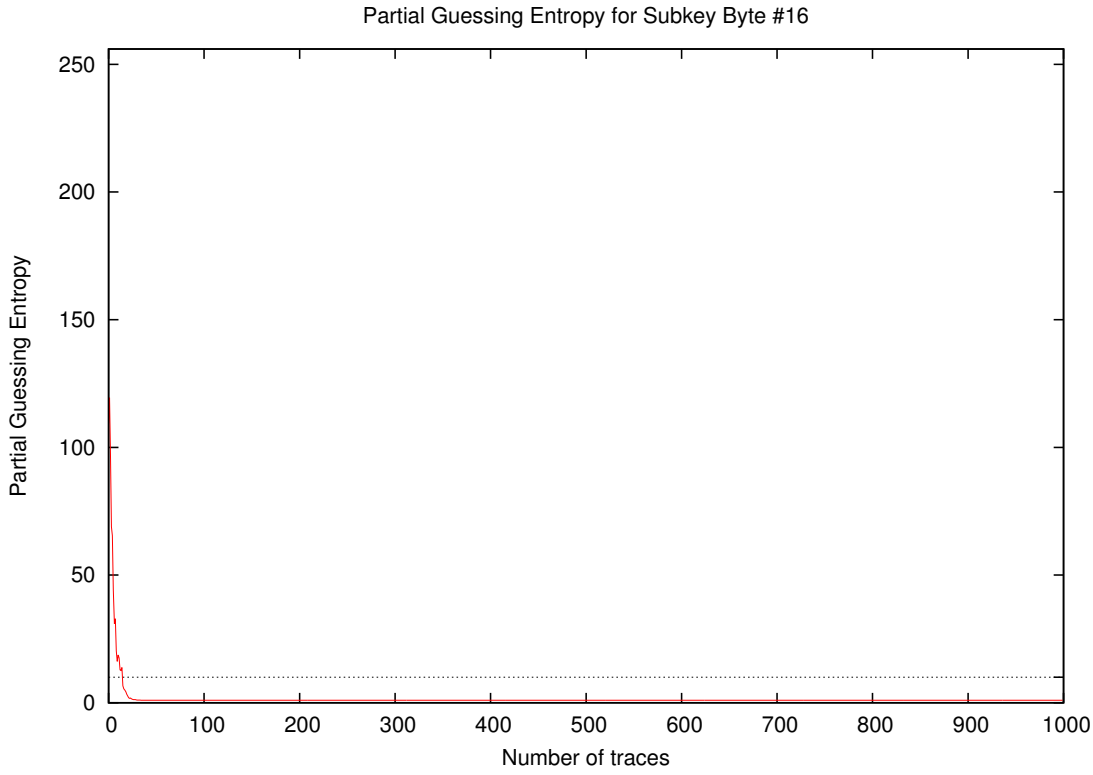
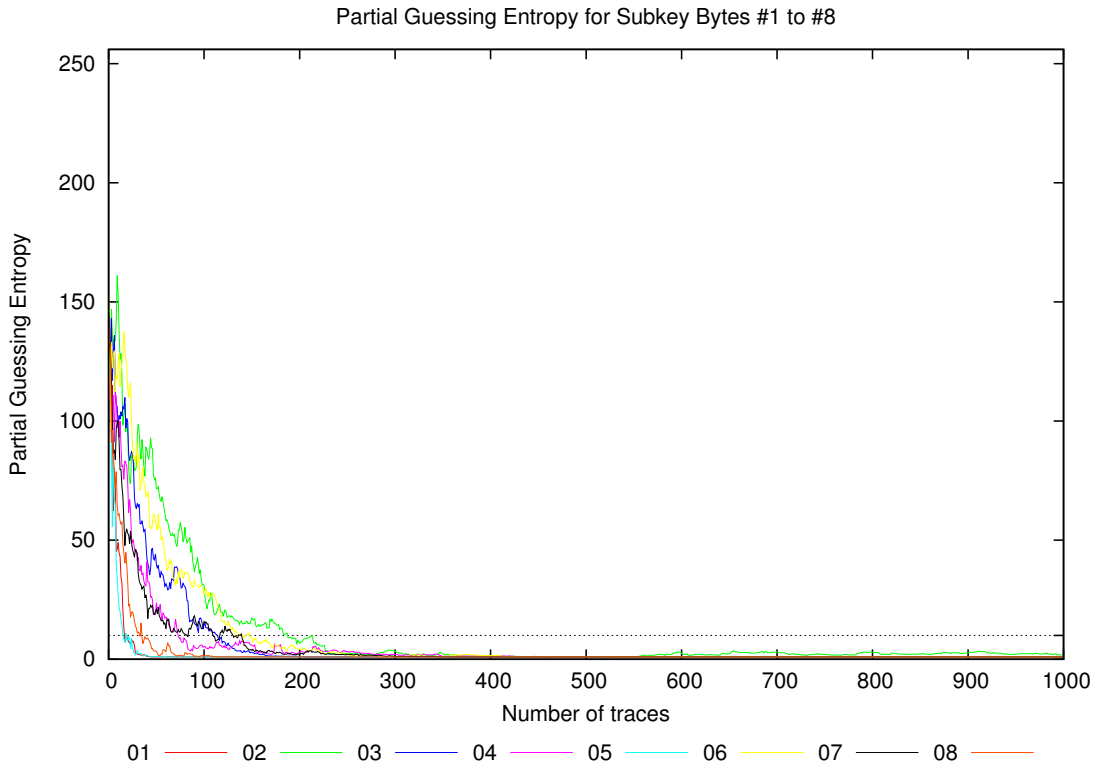
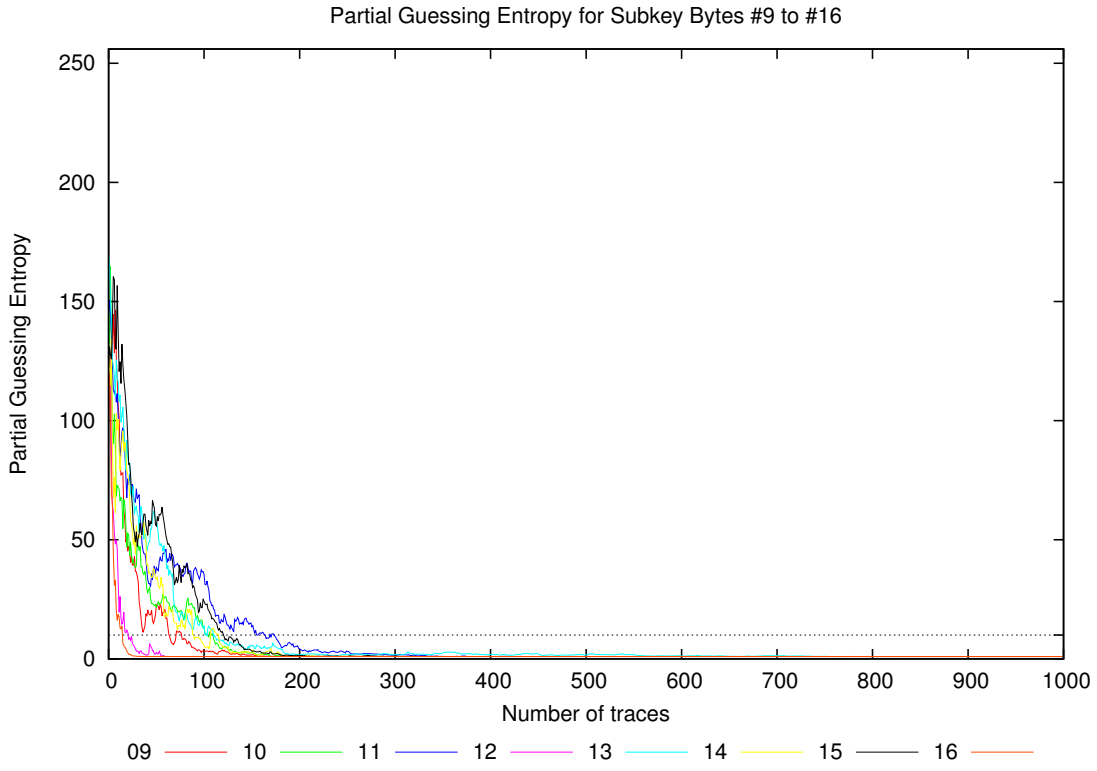
50
100
150
200
250
0
100
200
300
400
500
600
700
800
900
1000


Partial Guessing Entropy for Subkey Byte #14
Partial Guessing Entropy
Number of traces
0
50
100
150
200
250
0
100
200
300
400
500
600
700
800
900
1000


Partial Guessing Entropy for Subkey Byte #15
Partial Guessing Entropy
Number of traces
0
50
100
150
200
250
0
100
200
300
400
500
600
700
800
900
1000


Partial Guessing Entropy for Subkey Byte #16
Partial Guessing Entropy
Number of traces
0
50
100
150
200
250
0
100
200
300
400
500
600
700
800
900
1000


Partial Guessing Entropy for Subkey Bytes #1 to #8
Partial Guessing Entropy
Number of traces
0
50
100
150
200
250
0
100
200
300
400
500
600
700
800
900
1000
01
02
03
04
05
06
07
08


Partial Guessing Entropy for Subkey Bytes #9 to #16
Partial Guessing Entropy
Number of traces
0
50
100
150
200
250
0
100
200
300
400
500
600
700
800
900
1000
09
10
11
12
13
14
15
16

Traces	Partial Guessing Entropy / Byte																Min	Max	Mean
	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16			
10	46.1	161.1	105.9	98.0	34.0	117.6	99.2	64.7	117.9	72.9	111.4	46.1	117.6	96.1	156.7	16.2	16.2	161.1	91.3
20	9.4	99.9	101.1	80.9	8.2	122.6	54.5	39.4	51.1	46.8	67.6	12.1	91.9	79.3	102.0	3.3	3.3	122.6	60.6
30	2.5	80.8	63.2	45.8	2.3	91.1	45.1	13.1	36.5	39.0	71.4	3.2	64.0	55.9	53.4	1.1	1.1	91.1	41.8
40	1.5	89.1	49.2	30.9	1.8	68.2	27.0	8.8	18.9	33.7	41.8	1.6	51.4	49.6	56.1	1.0	1.0	89.1	33.2
50	1.0	76.1	44.2	18.8	1.1	57.8	20.1	3.4	18.5	22.8	35.7	2.1	58.2	33.7	56.4	1.0	1.0	76.1	28.2
100	1.0	31.4	12.6	5.1	1.0	29.4	13.6	1.5	3.2	13.0	36.6	1.0	13.1	6.2	24.9	1.0	1.0	36.6	12.2
200	1.0	7.4	1.1	2.6	1.0	4.1	2.2	1.0	1.0	1.0	4.3	1.0	1.7	1.1	1.5	1.0	1.0	7.4	2.1
300	1.0	3.6	1.0	1.9	1.0	1.1	1.2	1.0	1.0	1.0	1.6	1.0	1.8	1.1	1.1	1.0	1.0	3.6	1.3
400	1.0	1.5	1.0	1.2	1.0	1.5	1.0	1.0	1.0	1.0	1.0	1.0	1.9	1.0	1.0	1.0	1.0	1.9	1.1
500	1.0	1.1	1.0	1.1	1.0	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.5	1.0	1.0	1.0	1.0	1.5	1.1
600	1.0	2.9	1.0	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.2	1.0	1.0	1.0	1.0	2.9	1.1
700	1.0	3.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.3	1.0	1.0	1.0	1.0	3.1	1.1
800	1.0	3.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	3.0	1.1
900	1.0	2.6	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	2.6	1.1
1000	1.0	1.8	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.8	1.1