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The Center for Education and Research in Information Assurance and Security

Protecting Data with Forensics Just-in-Time(FoJiT)

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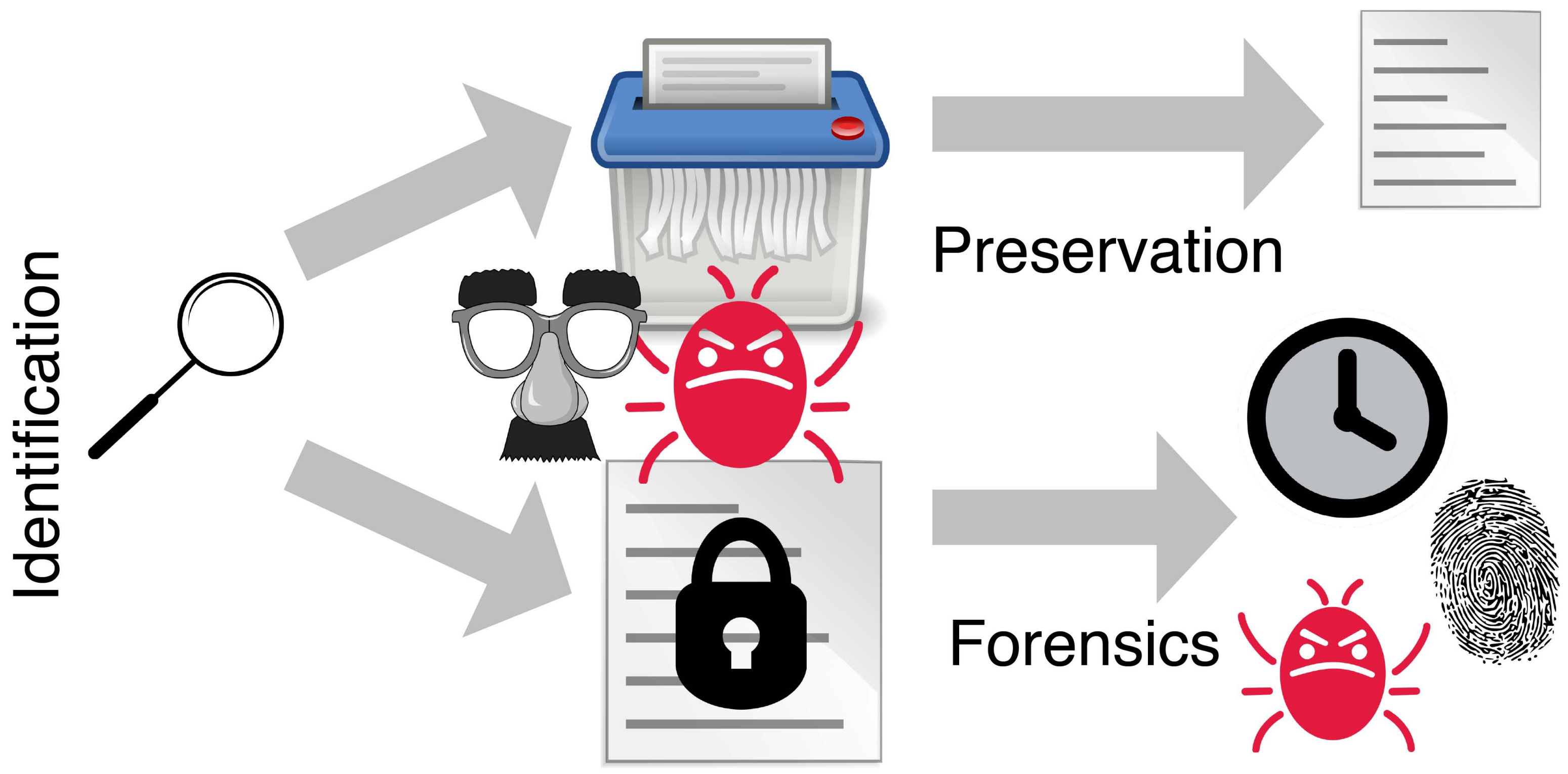
PROBLEM

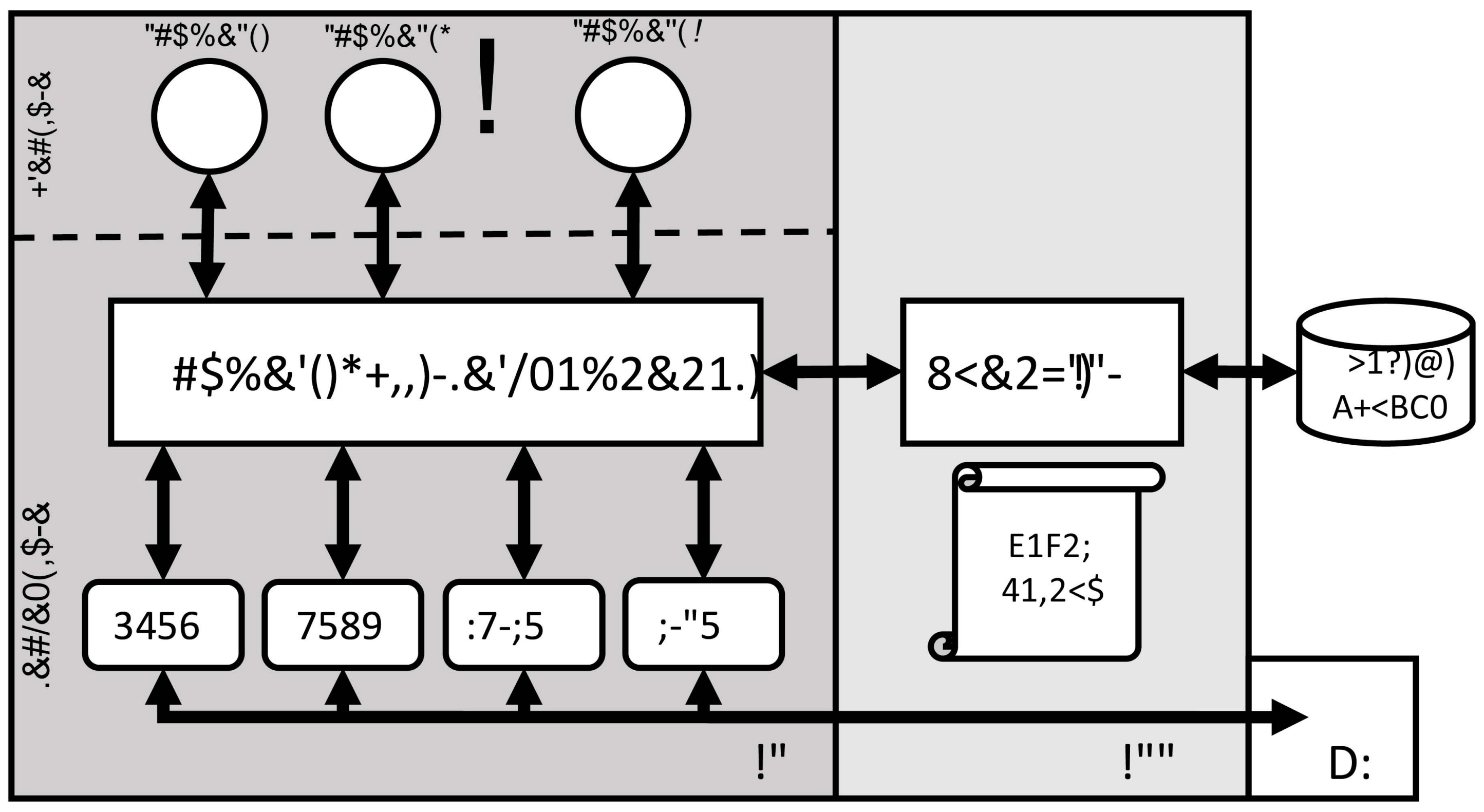
threatpost — DESTRUCTIVE STONEDRILL WIPER MALWARE ON THE LOOSE
by Michael Mimoso March 6, 2017

KASPERSKY lab — TRICKY LOCKY RANSOMWARE ROBS AMERICAN HOSPITALS
by Kate Kochetkova March 25, 2016

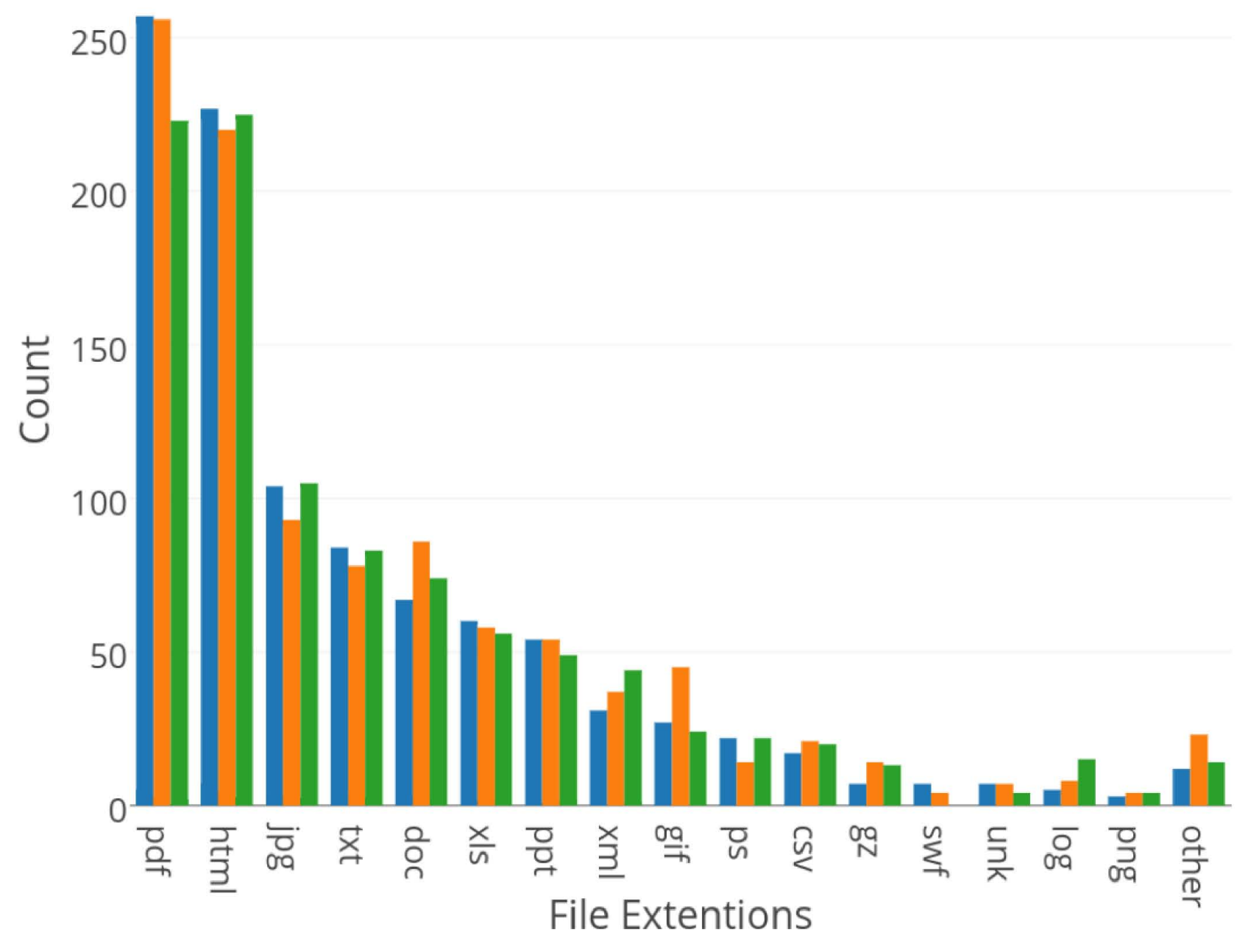
GOALS

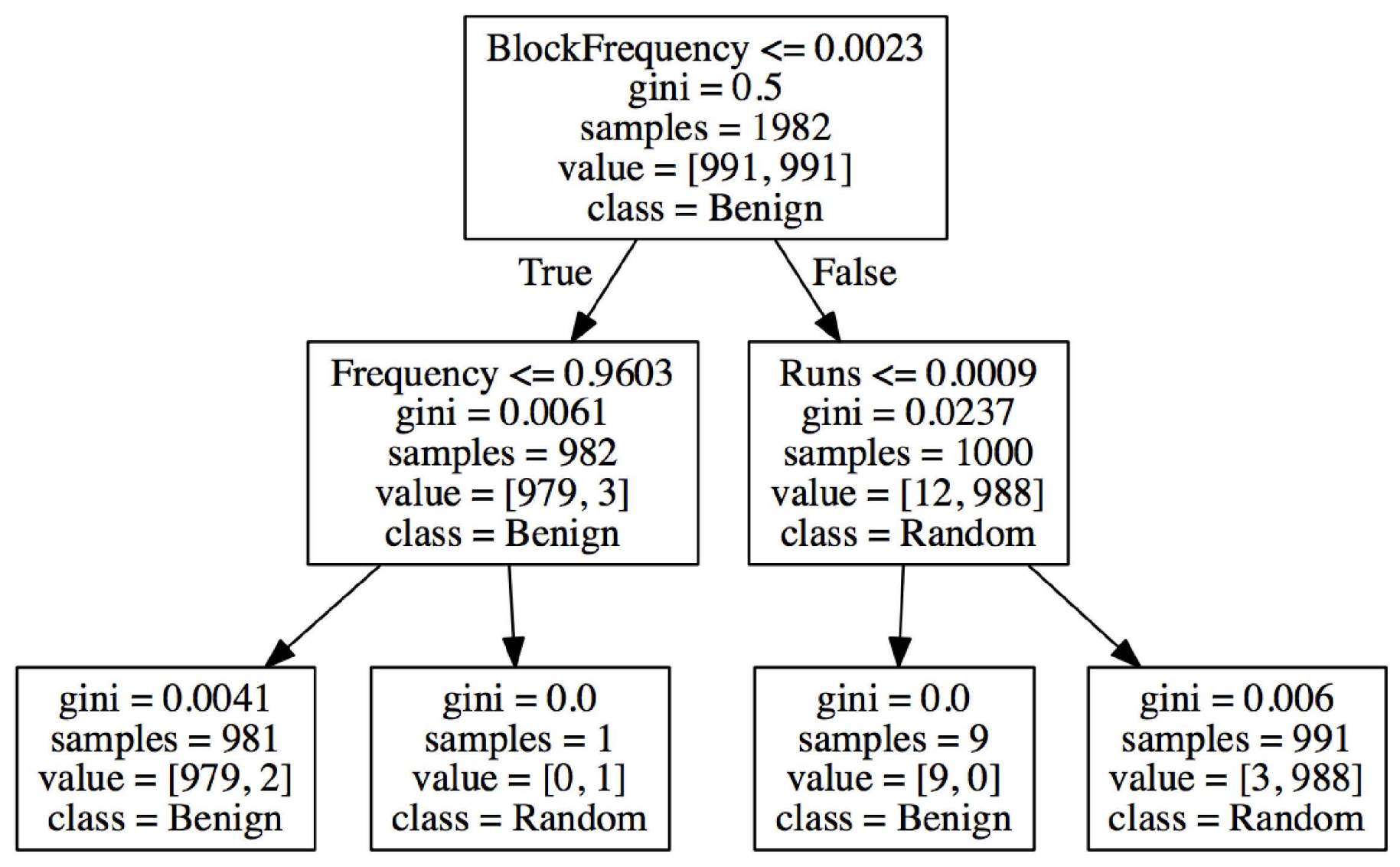


APPROACH



Preliminary Results




BlockFrequency <= 0.0023
gini = 0.5
samples = 1982
value = [991, 991]
class = Benign

True

False

Frequency <= 0.9603
gini = 0.0061
samples = 982
value = [979, 3]
class = Benign

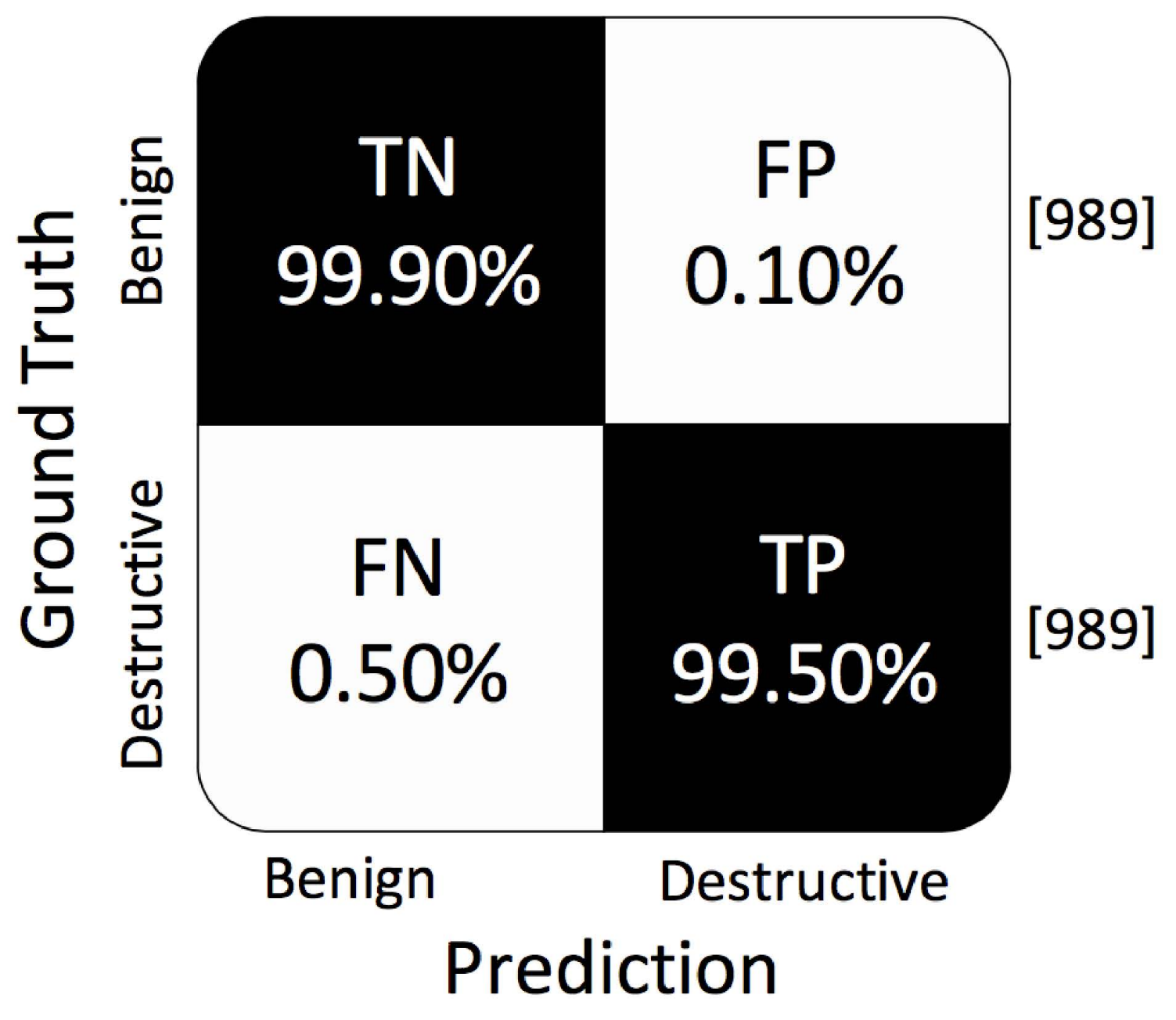
Runs <= 0.0009
gini = 0.0237
samples = 1000
value = [12, 988]
class = Random

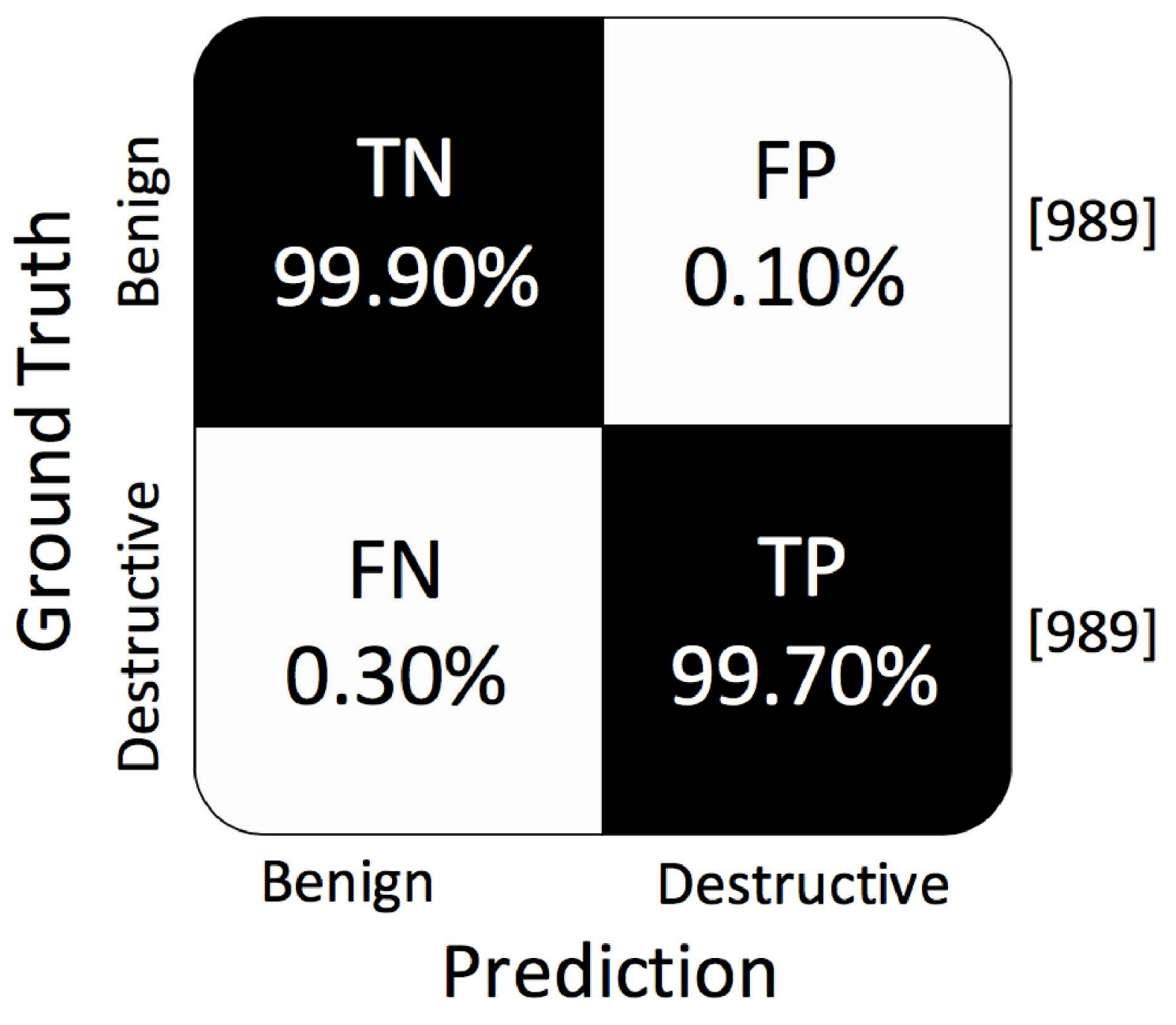
gini = 0.0041
samples = 981
value = [979, 2]
class = Benign

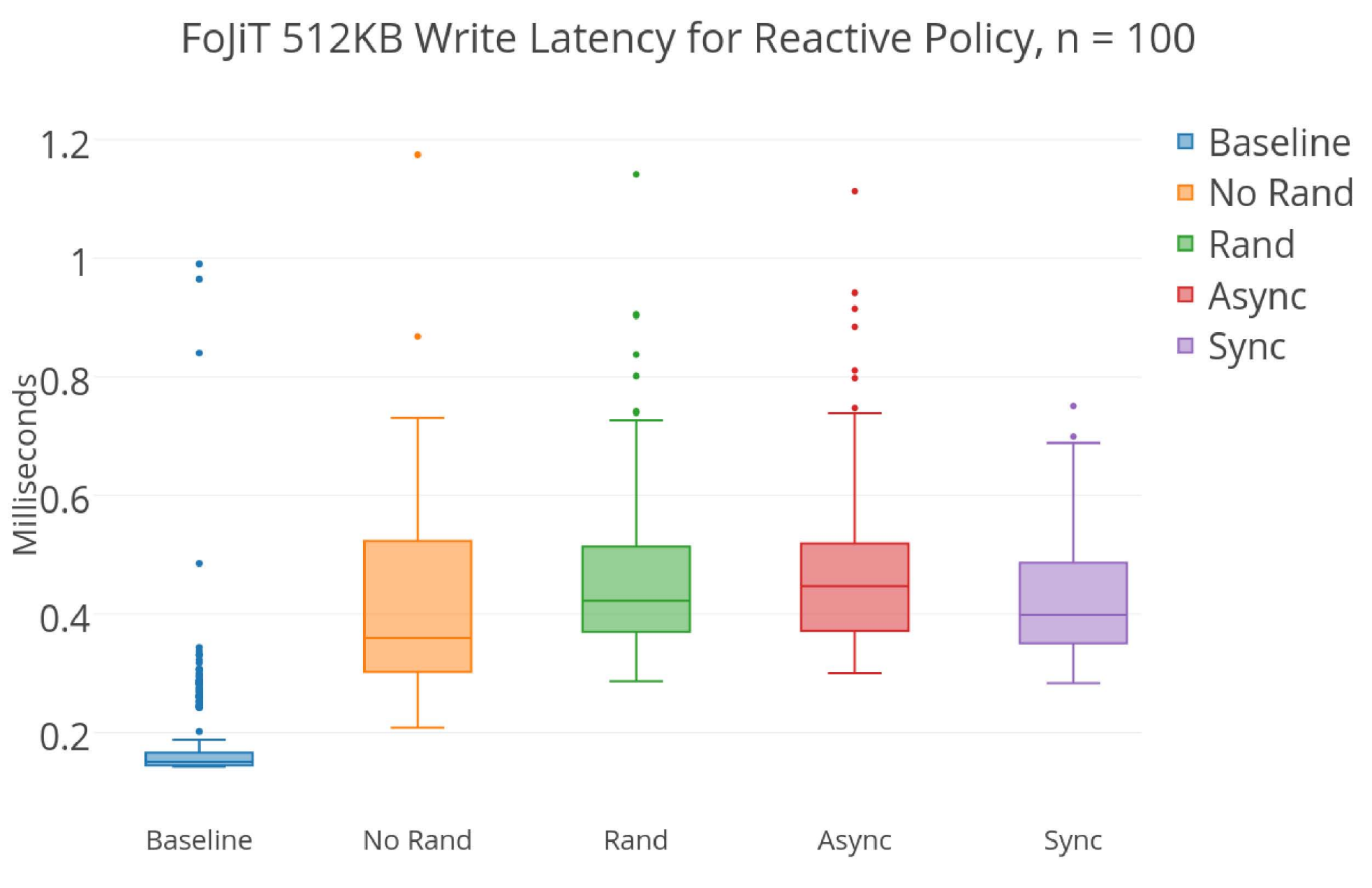
gini = 0.0
samples = 1
value = [0, 1]
class = Random

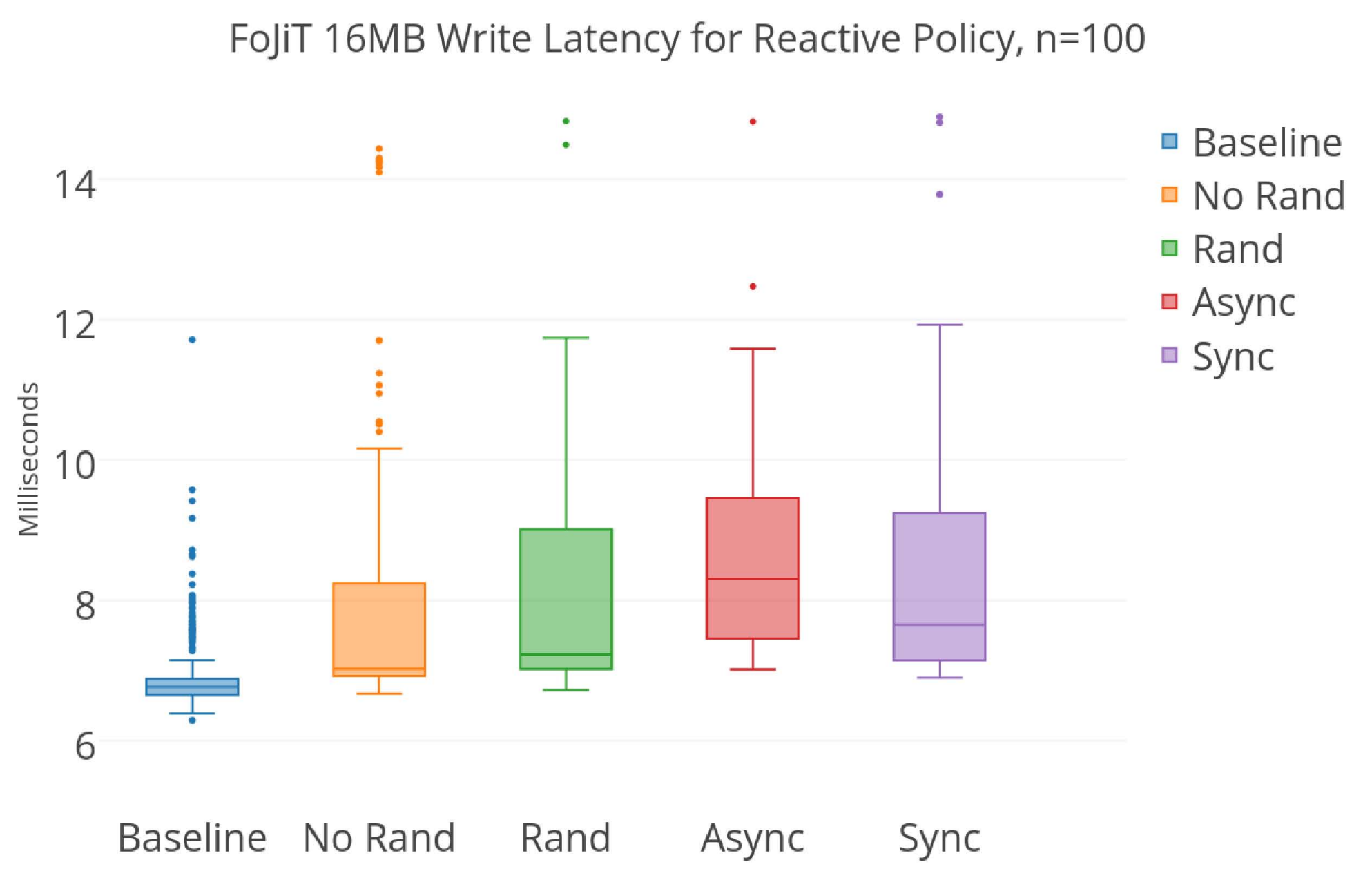
gini = 0.0
samples = 9
value = [9, 0]
class = Benign

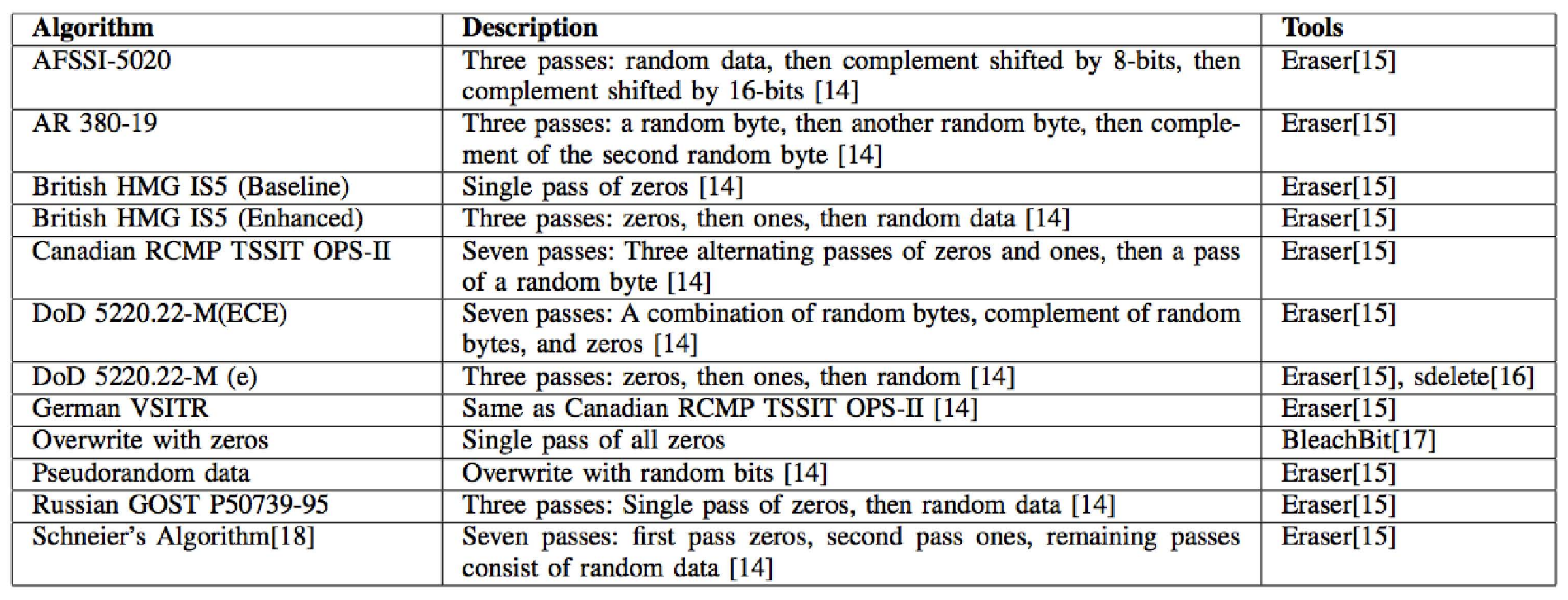
gini = 0.006
samples = 991
value = [3, 988]
class = Random






FoJiT 512KB Write Latency for Reactive Policy, n = 100


FoJiT 16MB Write Latency for Reactive Policy, n=100



Algorithm	Description	Tools
AFSSI-5020	Three passes: random data, then complement shifted by 8-bits, then complement shifted by 16-bits [14]	Eraser[15]
AR 380-19	Three passes: a random byte, then another random byte, then complement of the second random byte [14]	Eraser[15]
British HMG IS5 (Baseline)	Single pass of zeros [14]	Eraser[15]
British HMG IS5 (Enhanced)	Three passes: zeros, then ones, then random data [14]	Eraser[15]
Canadian RCMP TSSIT OPS-II	Seven passes: Three alternating passes of zeros and ones, then a pass of a random byte [14]	Eraser[15]
DoD 5220.22-M(ECE)	Seven passes: A combination of random bytes, complement of random bytes, and zeros [14]	Eraser[15]
DoD 5220.22-M (e)	Three passes: zeros, then ones, then random [14]	Eraser[15], sdelete[16]
German VSITR	Same as Canadian RCMP TSSIT OPS-II [14]	Eraser[15]
Overwrite with zeros	Single pass of all zeros	BleachBit[17]
Pseudorandom data	Overwrite with random bits [14]	Eraser[15]
Russian GOST P50739-95	Three passes: Single pass of zeros, then random data [14]	Eraser[15]
Schneier's Algorithm[18]	Seven passes: first pass zeros, second pass ones, remaining passes consist of random data [14]	Eraser[15]

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