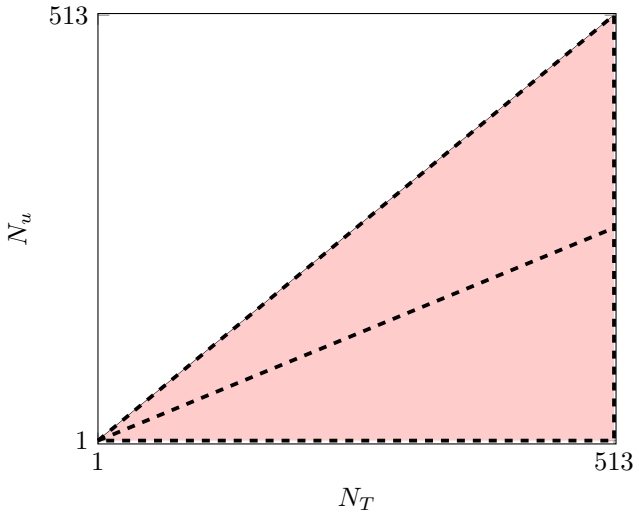
The explored triangle (benchmark parameters along dashed lines)



Performance benchmarks for record functional update

Given a record, let N_T be its total number of fields and N_u the number of fields updated in a functional-style update.

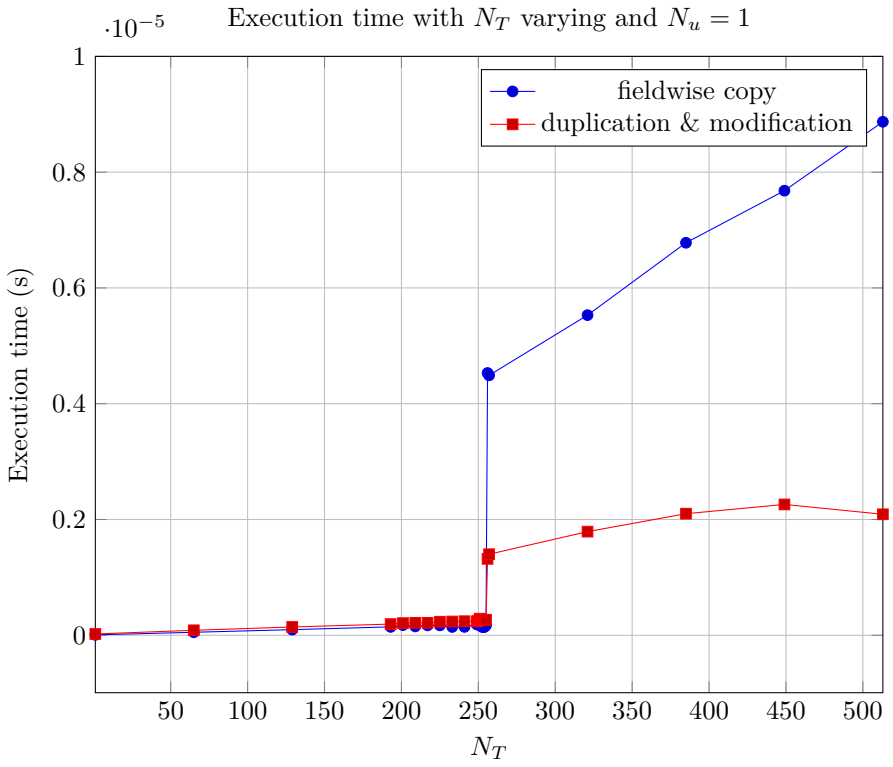
The benchmarks compare the two methods (fieldwise copy and the "duplication and modification" method) by comparing the times needed to update the record under each method in the parameter space (N_T, N_u).

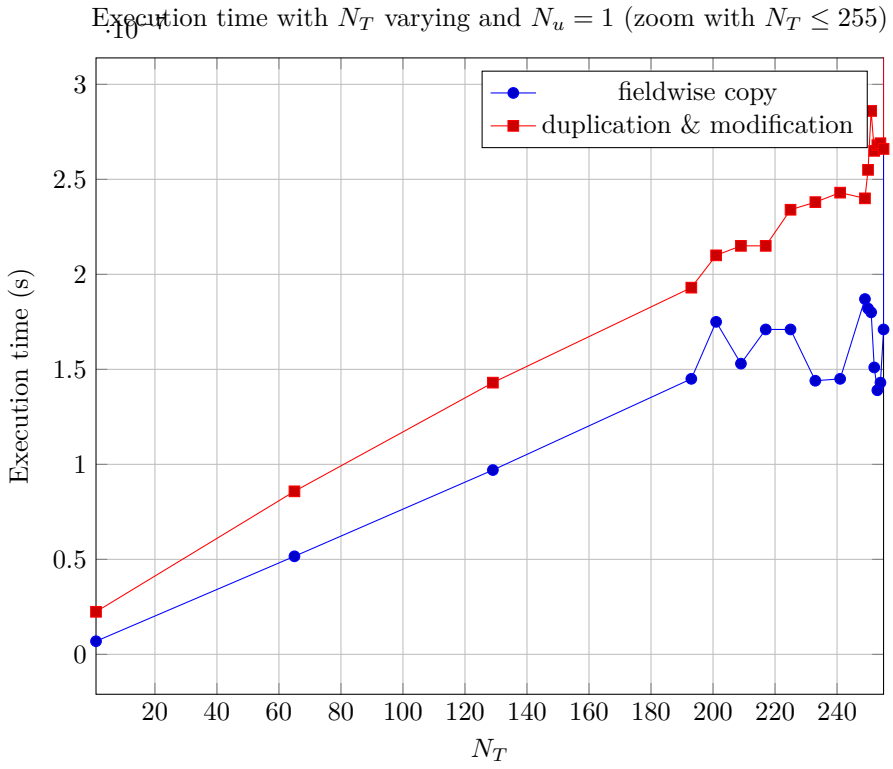
Since $N_u \leq N_T$, we need only explore the domain below the $N_u = N_T$ line. The choice has been made to benchmark the two methods along the boundaries of the triangle defined by:

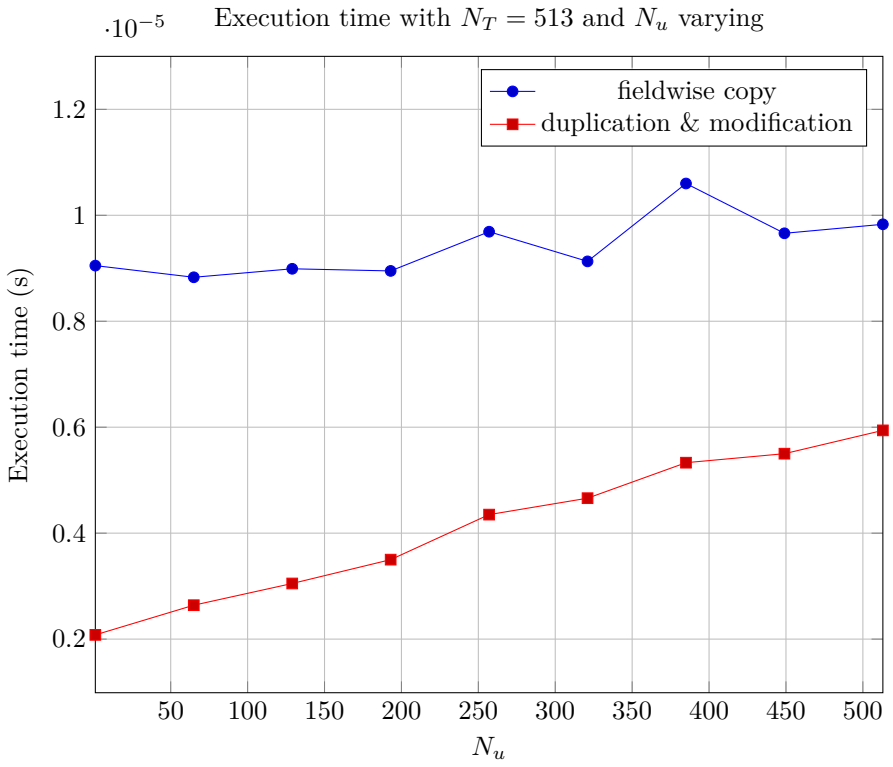
$$1 \leq N_u \leq N_T \leq 513$$

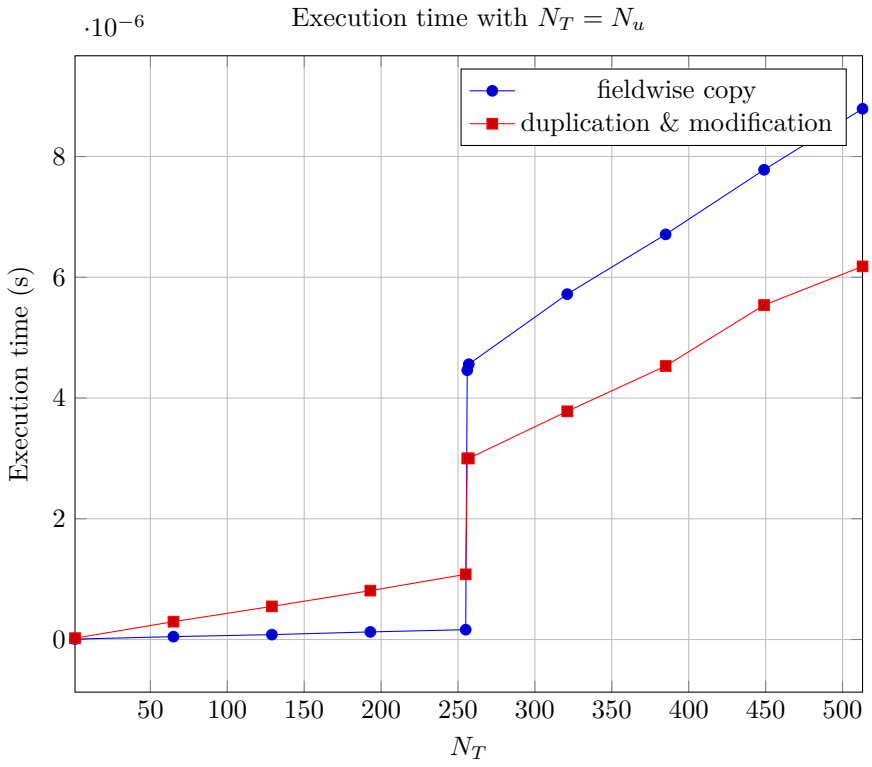
Under the assumption that the two domains where one methods outperforms the other are linearly separable, running benchmarks only along these boundaries is sufficient to determine the frontier between them. To validate that assumption, benchmarks were also run along the line defined by $N_T = 2N_u - 1$, which passes roughly through the middle of the explored triangle.

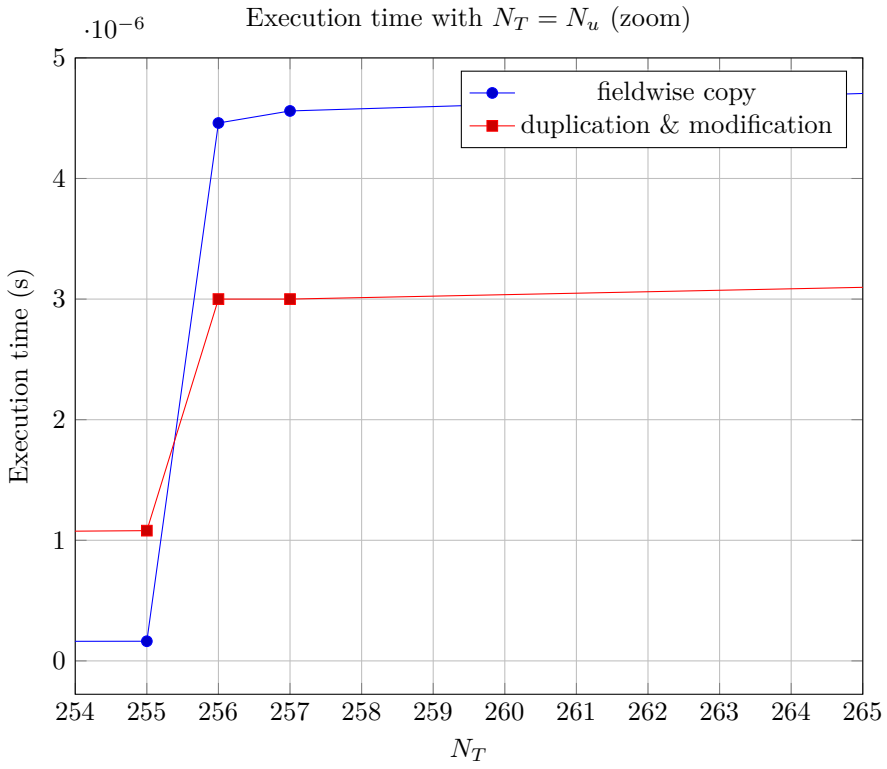
The results show that fieldwise copy always outperforms the other method while $N_T \leq 255$, but with $N_T \geq 255$ the "duplication and modification" method is much faster.

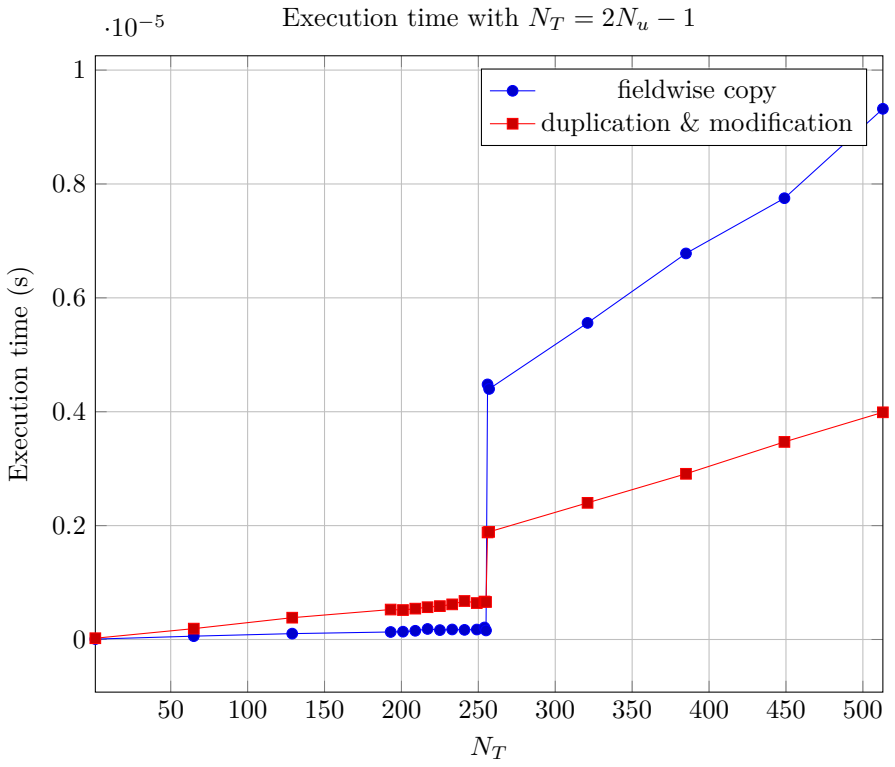

Execution time with N_T varying and $N_u = 1$
$\cdot 10^{-5}$
1
0.8
0.6
0.4
0.2
0
Execution time (s)
50
100
150
200
250
300
350
400
450
500
N_T
fieldwise copy
duplication & modification

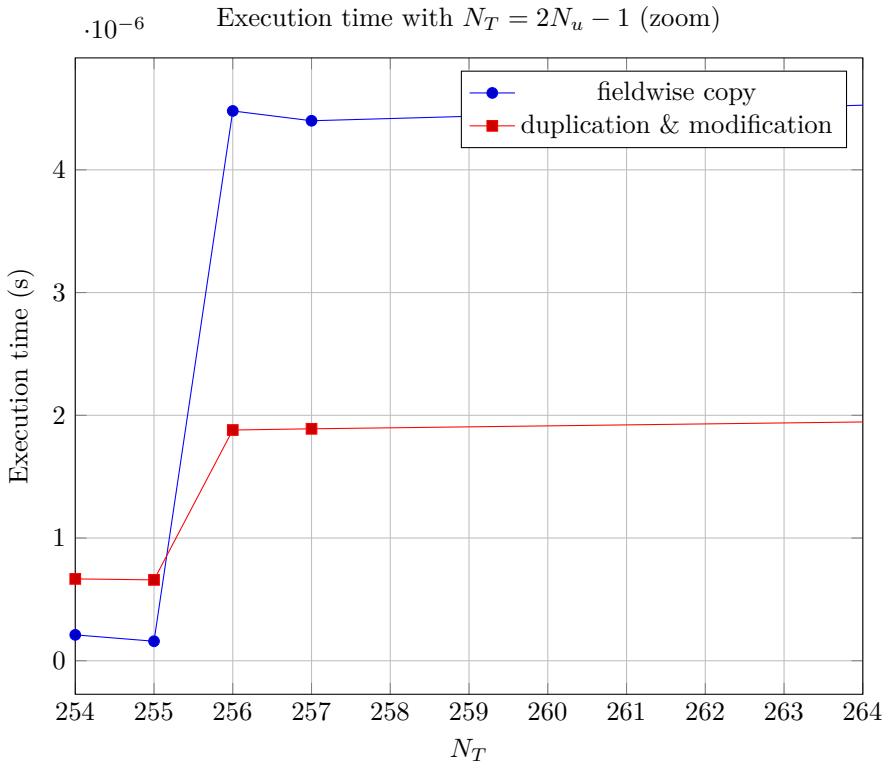

Execution time with N_T varying and $N_u = 1$ (zoom with $N_T \leq 255$)
$\cdot 10^{-4}$
Execution time (s)
N_T
fieldwise copy
duplication & modification
0
0.5
1
1.5
2
2.5
3
20
40
60
80
100
120
140
160
180
200
220
240


Execution time with $N_T = 513$ and N_u varying
$\cdot 10^{-5}$
Execution time (s)
1.2
1
0.8
0.6
0.4
0.2
50
100
150
200
250
300
350
400
450
500
N_u
fieldwise copy
duplication & modification


Execution time with $N_T = N_u$
$\cdot 10^{-6}$
fieldwise copy
duplication & modification
Execution time (s)
0
2
4
6
8
50
100
150
200
250
300
350
400
450
500
N_T


Execution time with $N_T = N_u$ (zoom)
$\cdot 10^{-6}$
5
4
3
2
1
0
Execution time (s)
254
255
256
257
258
259
260
261
262
263
264
265
N_T
fieldwise copy
duplication & modification


Execution time with $N_T = 2N_u - 1$
$\cdot 10^{-5}$
Execution time (s)
1
0.8
0.6
0.4
0.2
0
50
100
150
200
250
300
350
400
450
500
N_T
fieldwise copy
duplication & modification


Execution time with $N_T = 2N_u - 1$ (zoom)
$\cdot 10^{-6}$
Execution time (s)
0
1
2
3
4
254
255
256
257
258
259
260
261
262
263
264
N_T
fieldwise copy
duplication & modification