

# Rollups benchmarks

Benchmarking exec units as a function of “update length”

---

## Preamble

```
In[201]:= SetDirectory[NotebookDirectory[]];
```

Reference protocol parameters (June 2023)

```
In[*]:= maxExSteps = 10 000 000 000;  
maxExMem = 14 000 000;
```

Import benchmark data

```
In[202]:= data = Import["rollupBench_1.csv", "CSV"];
```

---

## Data analysis

### CPU

```
In[221]:= cpuData = {#[[1]], #[[2]]} & /@ data
```

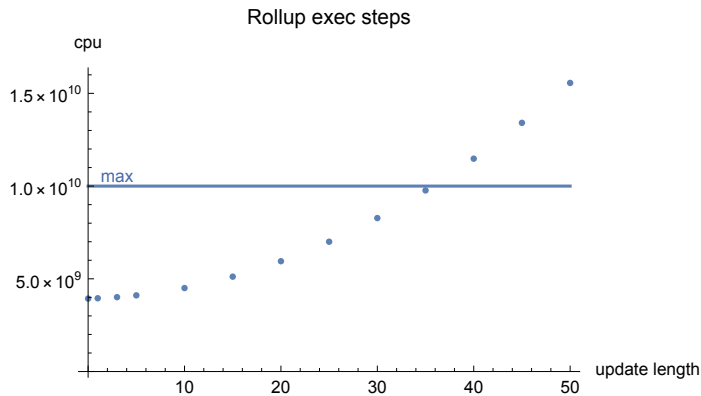
```
Out[221]= {{0, 3 932 911 529}, {1, 3 951 536 557}, {3, 4 010 872 807},  
          {5, 4 108 149 099}, {10, 4 501 571 619}, {15, 5 116 254 439}, {20, 5 949 205 309},  
          {25, 7 000 133 379}, {30, 8 275 563 299}, {35, 9 766 185 919},  
          {40, 11 477 861 089}, {45, 13 410 838 109}, {50, 15 562 332 479}}
```

## Data plot (CPU)

In[209]:=

```
ListPlot[cpuData, PlotRange → All,
  PlotLabel → "Rollup exec steps", AxesLabel → {"update length", "cpu"}];
Plot[maxExSteps, {x, 0, 50}];
Graphics[Text[Style["max", Blue], {3, maxExSteps}, {0, -1}]];
cpuPlot = Show[%%, %, %]
```

Out[212]=



## Reaching maximum budget

In[218]:=

```
FindRoot[Interpolation[cpuData][ul] == maxExSteps, {ul, 40}]
```

Out[218]=

```
{ul → 35.7229}
```

∴ CPU budget is exceeded when *update length* is  $\geq 36$ .

## Memory

In[222]:=

```
memData = {#[[1]], #[[3]]} & /@ data
```

Out[222]=

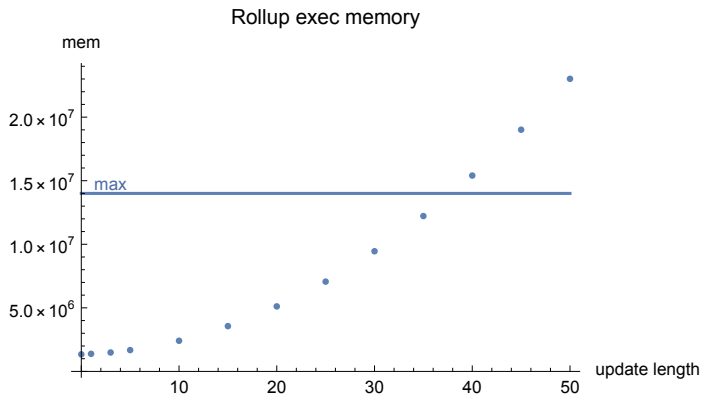
```
{ {0, 1 342 318}, {1, 1 383 725}, {3, 1 488 795}, {5, 1 676 873}, {10, 2 410 228},
  {15, 3 562 383}, {20, 5 113 338}, {25, 7 063 093}, {30, 9 451 648},
  {35, 12 219 003}, {40, 15 405 158}, {45, 19 010 113}, {50, 23 013 868} }
```

## Data plot (memory)

In[223]:=

```
ListPlot[memData, PlotRange → All,
  PlotLabel → "Rollup exec memory", AxesLabel → {"update length", "mem"}];
Plot[maxExMem, {x, 0, 50}];
Graphics[Text[Style["max", #], {3, maxExMem}, {0, -1}]];
memPlot = Show[%%, %, %]
```

Out[226]=



## Reaching maximum budget

In[228]:=

```
FindRoot[Interpolation[memData][ul] == maxExMem, {ul, 40}]
```

Out[228]=

```
{ul → 37.8752}
```

∴ Memory budget is exceded when *update length* is  $\geq 38$ .

## Conclusion

To be within exec units budget, *update length* must be 35 or less.

