Rollups benchmarks

Benchmarking exec units as a function of “update length”

Preamble

In[361]:=

```
SetDirectory[NotebookDirectory[]];
```

Reference protocol parameters (June 2023)

In[362]:=

```
maxExSteps = 10 000 000 000;
maxExMem = 14 000 000;
```

Import benchmark data

In[364]:=

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

Data analysis

CPU

In[365]:=

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

Out[365]=

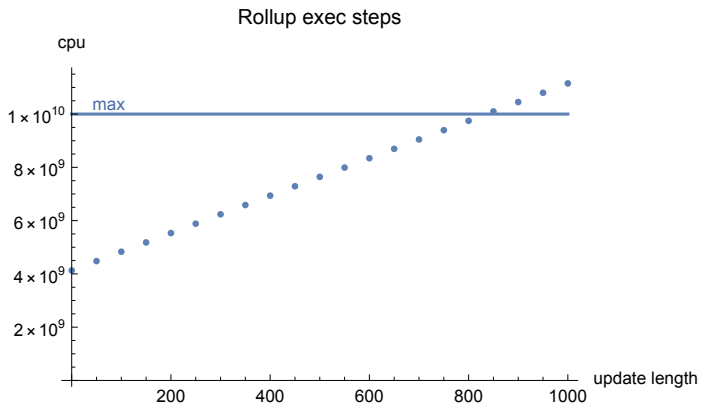
```
{{0, 4 128 437 479}, {50, 4 480 400 069}, {100, 4 832 362 659},
 {150, 5 181 116 939}, {200, 5 533 079 529}, {250, 5 885 042 119}, {300, 6 237 004 709},
 {350, 6 585 758 989}, {400, 6 937 721 579}, {450, 7 289 684 169}, {500, 7 641 646 759},
 {550, 7 990 401 039}, {600, 8 342 363 629}, {650, 8 694 326 219}, {700, 9 046 288 809},
 {750, 9 395 043 089}, {800, 9 747 005 679}, {850, 10 098 968 269},
 {900, 10 450 930 859}, {950, 10 799 685 139}, {1000, 11 151 647 729}}
```

Data plot (CPU)

In[366]:=

```
ListPlot[cpuData, PlotRange → All,
  PlotLabel → "Rollup exec steps", AxesLabel → {"update length", "cpu"}];
Plot[maxExSteps, {x, 0, First@Last[cpuData]}];
Graphics[Text[Style["max", ■], {75, maxExSteps}, {0, -1}]];
cpuPlot = Show[%%%, %%, %]
```

Out[369]=



Reaching maximum budget

In[370]:=

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

Out[370]=

```
{ul → 835.941}
```

∴ CPU budget is exceded when *update length* is ≥ 836 .

Memory

In[371]:=

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

Out[371]=

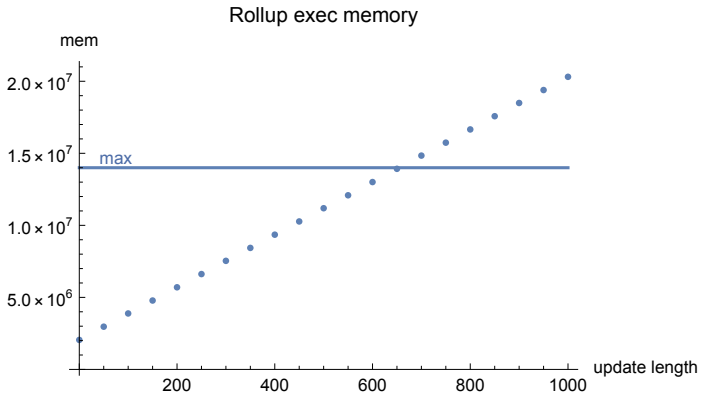
```
{{0, 2 047 436}, {50, 2 965 536}, {100, 3 883 636}, {150, 4 781 736}, {200, 5 699 836},
 {250, 6 617 936}, {300, 7 536 036}, {350, 8 434 136}, {400, 9 352 236},
 {450, 10 270 336}, {500, 11 188 436}, {550, 12 086 536}, {600, 13 004 636},
 {650, 13 922 736}, {700, 14 840 836}, {750, 15 738 936}, {800, 16 657 036},
 {850, 17 575 136}, {900, 18 493 236}, {950, 19 391 336}, {1000, 20 309 436}}
```

Data plot (memory)

In[372]:=

```
ListPlot[memData, PlotRange → All,
  PlotLabel → "Rollup exec memory", AxesLabel → {"update length", "mem"}];
Plot[maxExMem, {x, 0, First@Last[cpuData]}];
Graphics[Text[Style["max", ■], {75, maxExMem}, {0, -1}]];
memPlot = Show[%%%, %%, %]
```

Out[375]=



Reaching maximum budget

In[376]:=

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

Out[376]=

```
{ul → 654.193}
```

∴ Memory budget is exceeded when *update length* is ≥ 655 .

Conclusion

To be within exec units budget, *update length* must be 654 or less.

Out[378]=