



# The Batch Pattern

given:

set of items

function  $f(\text{item})$  to apply to each item

solution:

collect  $k$  items (batch them)

then apply modified  $f()$  on all items in batch simultaneously

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might be cheaper to apply  $f()$  on a set of items

## drawbacks:

delays processing of individual items

implementation hints:

must limit time delay (latency) for individual item



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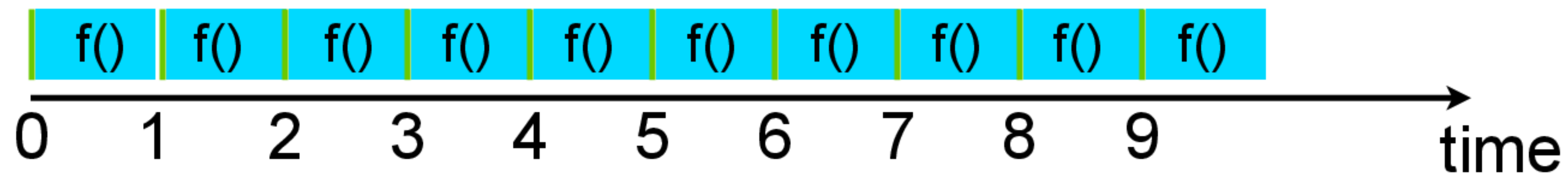
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must find sweet spot: latency vs. throughput

latency vs. throughput optimization

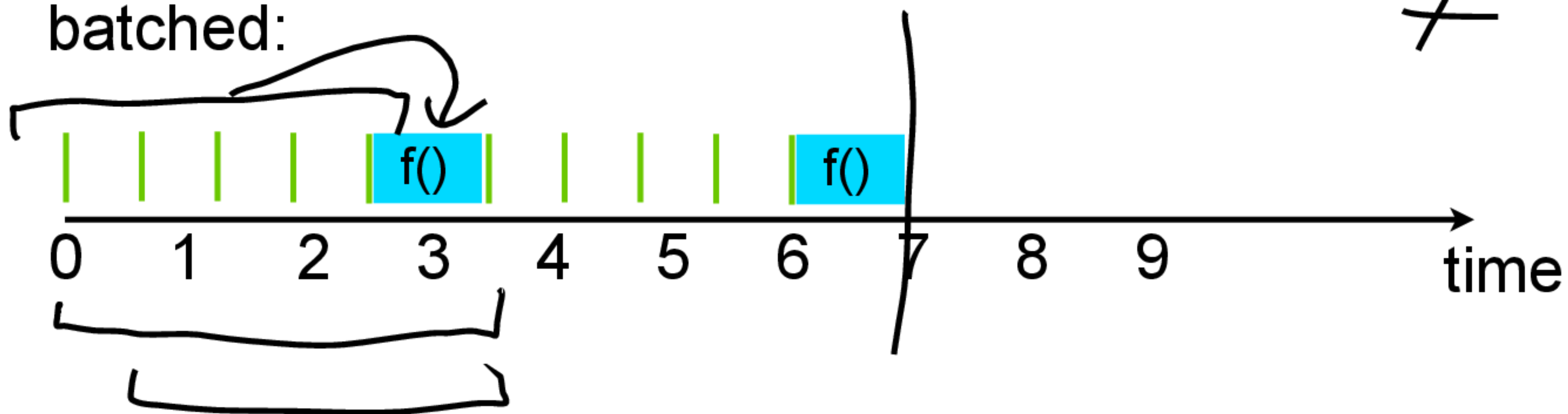
# Latency versus Throughput

non-batched:



$$\frac{10}{10} = 1$$

batched:



$$\frac{10}{7} = 1.43$$