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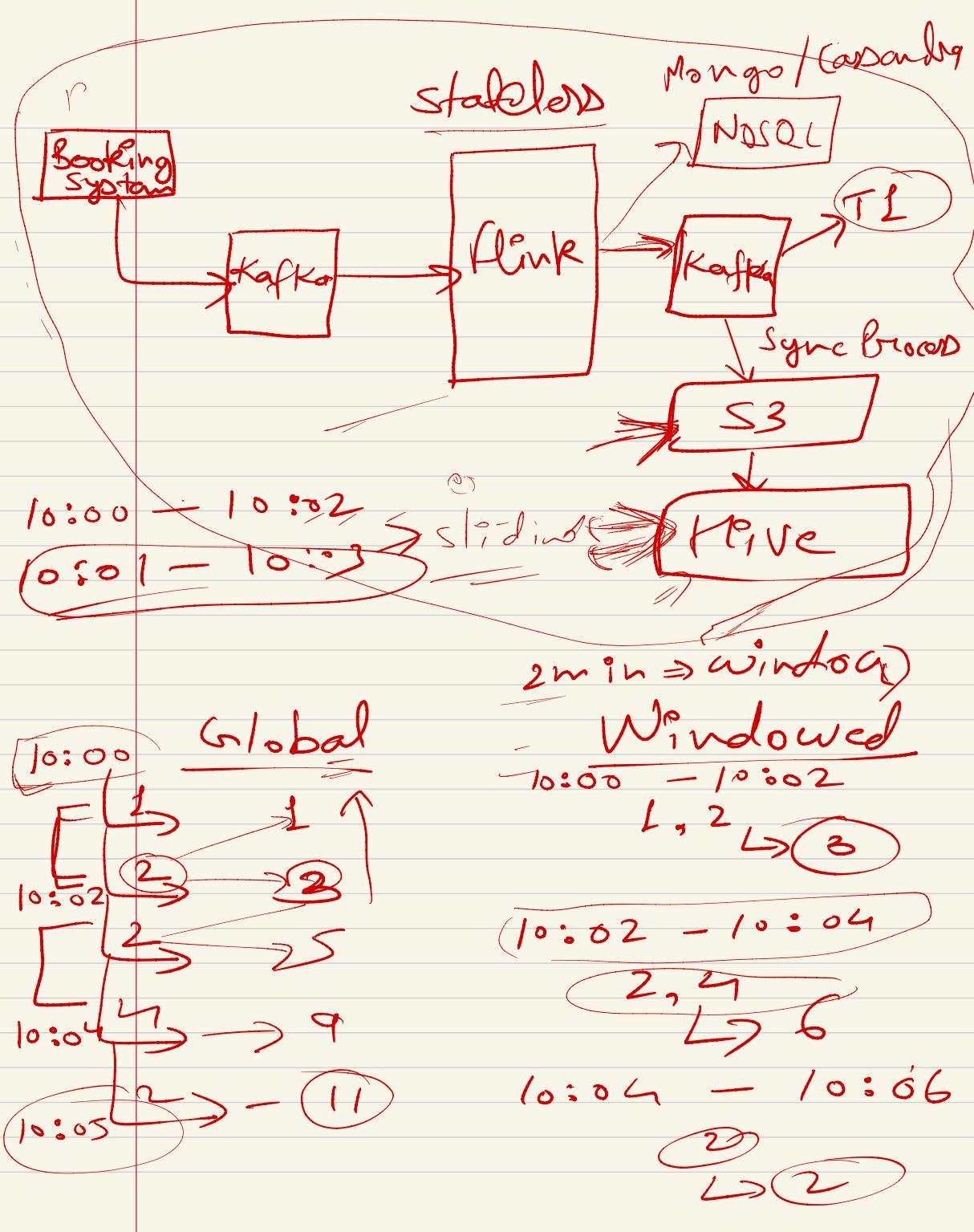
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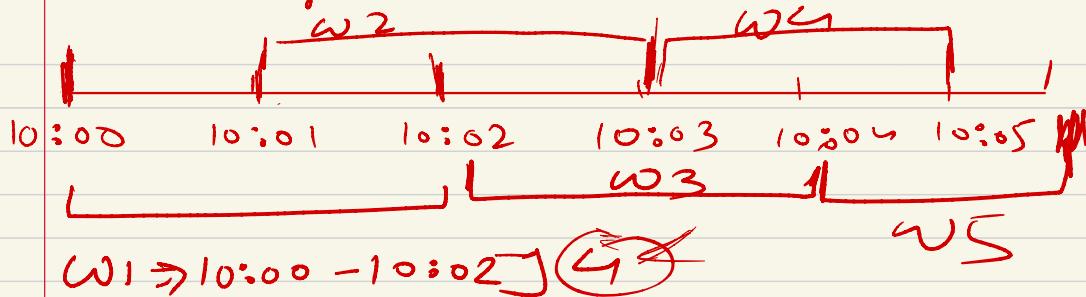
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Window Size = 2 min  
Sliding Win = 1 min



↳ Sliding Window

Win S = 1 min  
Sl. W = 1 min



kafka {User1, 10}

{User2, 20}

{User1, 5}

{User3, 30}

$\left[ \{ \text{User2}, 10 \} \right]$  trigger  
5 sec

User1

$\hookrightarrow \left[ \{ \text{User1}, 10 \}, \right.$   
 $\quad \quad \quad \left. \left[ \{ \text{User1}, 5 \} \right] \right]$

User2

$\hookrightarrow \left[ \{ \text{User2}, 20 \}, \right.$   
 $\quad \quad \quad \left. \{ \text{User2}, 10 \} \right]$

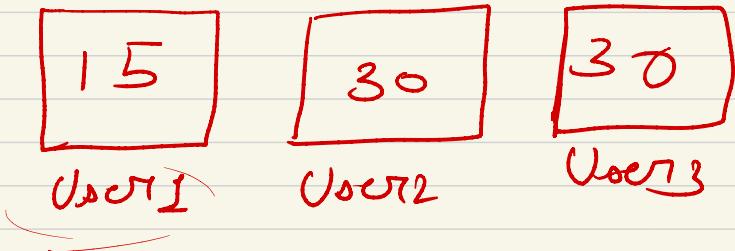
User3

$\hookrightarrow \left[ \{ \text{User3}, 30 \} \right]$

def update\_func(key, values, state):  
 if state.exists:  
 state.update(sum([ ]))  
 else:

[x. amount for x in values]

$$\text{sum}([10, 5]) = \textcircled{15}$$



$\boxed{[User1, 103, [User1, 53]]}$

User1

state.update(values)

SA

Kafka

Spark  
Stream

10:00 → ①

10:15 → ②

10:20 → ③

10:05 → ②

10:04 → ③

②

①

10:00

