Which FIFO is right for you?

Ask yourself two questions?

1. Will more than one thread concurrently read/write into the FIFO?

2. What should happen if the FIFO is full when writing/empty when reading?

Producer

Choose One

Single Thread

Multiple Thread

Choose One

Report if FIFO Full

(does not advance write pointer when full)

Overwrite when full

(always advances write pointer, never checks write pointer)

Consumer

Single Thread

Multiple Thread

Choose One

Report if FIFO Empty

(does not advance read pointer when empty)

Return “null” element

(always advances read pointer, never checks write pointer)

Example 1: audio thread is sending “down-sampled” audio to UI thread to display as waveform

Example 2: “Peak detection” from multiple sensors

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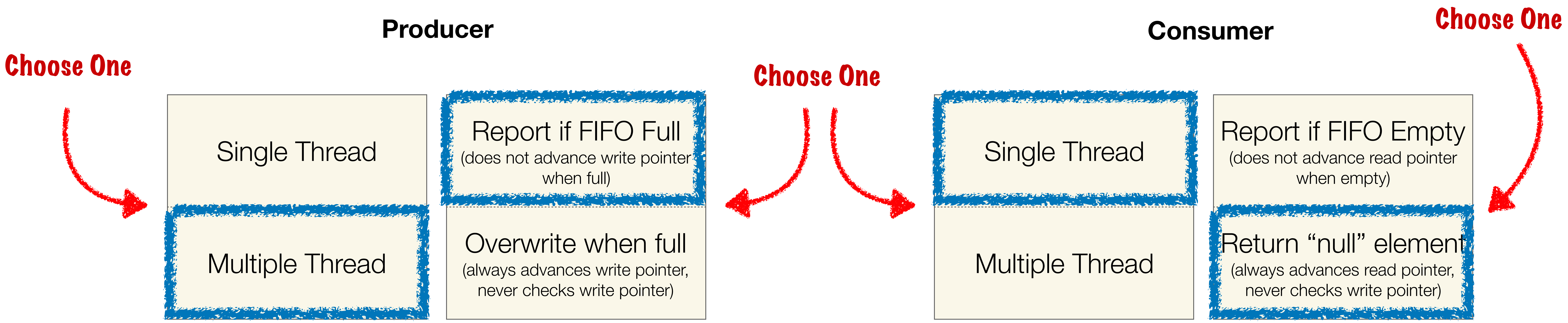

Producer

Choose One

Single Thread

Multiple Thread

Choose One

Report if FIFO Full
(does not advance write pointer when full)

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Consumer

Choose One

Single Thread

Multiple Thread

Choose One

Report if FIFO Empty
(does not advance read pointer when empty)

Return "null" element
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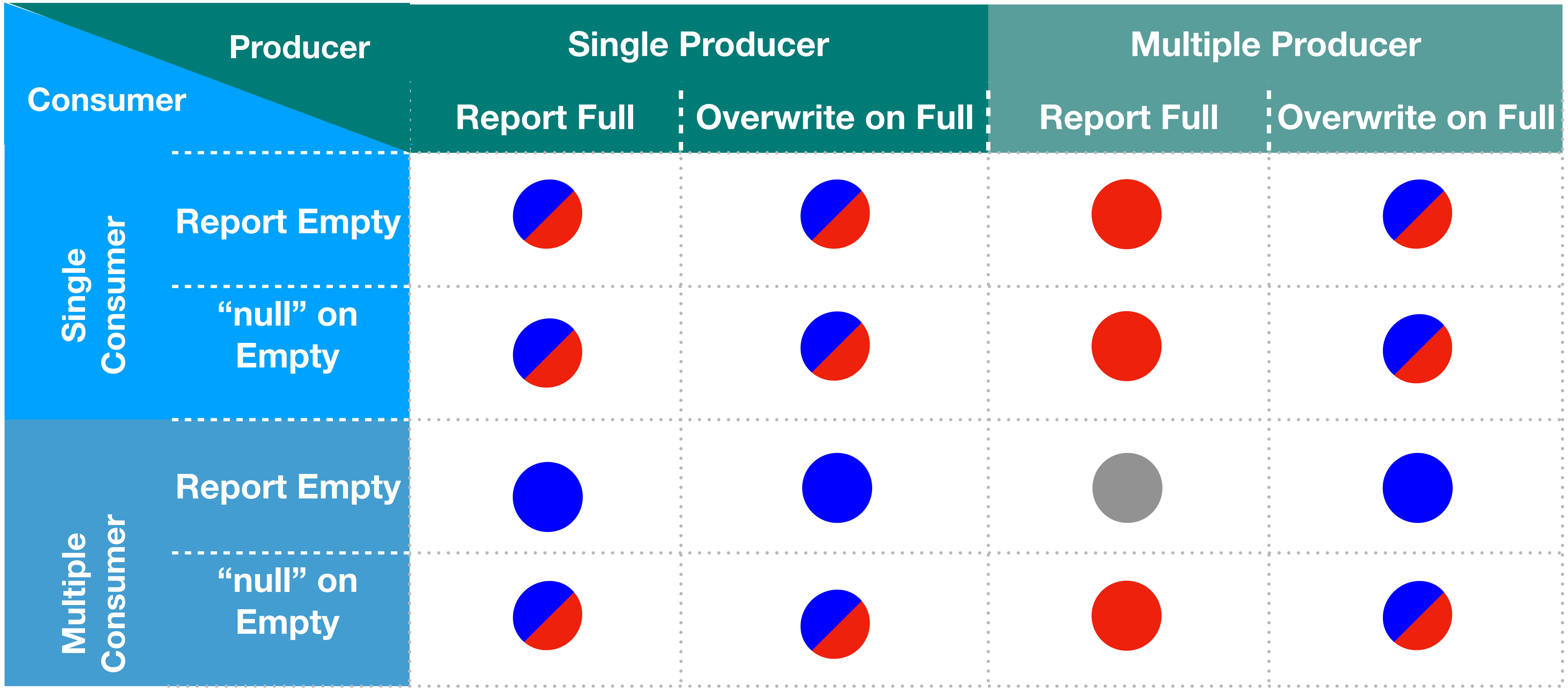
Example 2: "Peak detection" from multiple sensors

Costs of various FIFOs



Consumer \ Producer		Single Producer		Multiple Producer	
		Report Full	Overwrite on Full	Report Full	Overwrite on Full
Single Consumer	Report Empty	◑	◑	🔴	◑
	“null” on Empty	◑	◑	🔴	◑
Multiple Consumer	Report Empty	🔵	🔵	⚪	🔵
	“null” on Empty	◑	◑	🔴	◑

🔴 **Wait free on read**

🔵 **Wait free on write**

◑ **Wait free on read and write**

⚪ **Not wait free on write or read**