



**Problem: reading twice in a row:**

# Realtime Copy

A

**Double Buffering**

# Non-realtime Copy

Realtime thread only ever writes  
to this slot.

Non-realtime thread only reads  
from this slot.



**swaplotsjustbeforereading**



B

C

A large, white, serif capital letter 'C' is centered on a solid red background. The letter is slightly stylized with a small gap at the top and bottom of its curve.

B

Old data when new reality is read twice in a row

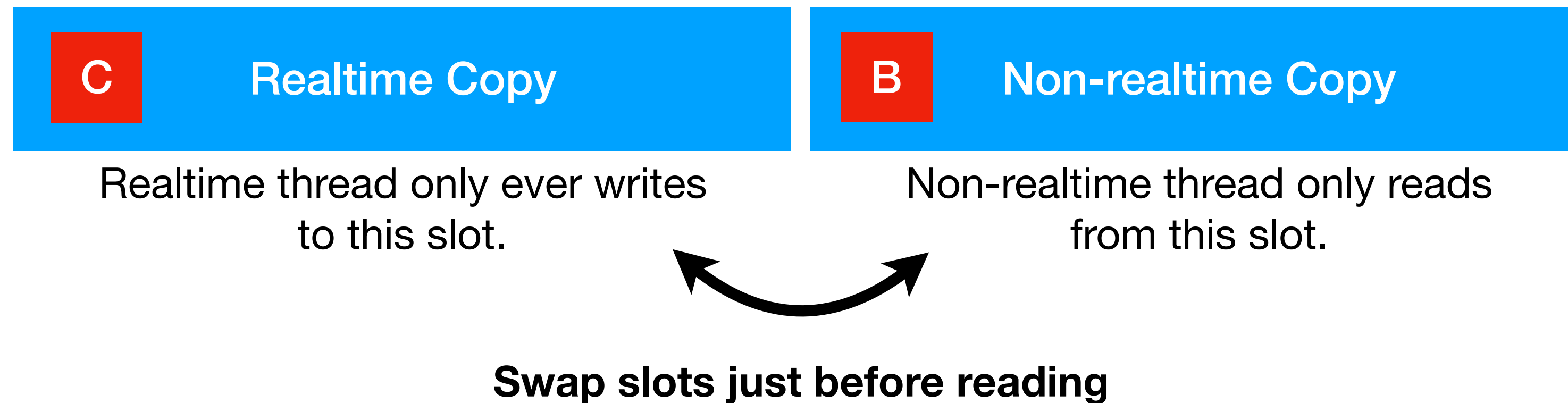
→ NewDataAvailable





# Double Buffering

**Problem: reading twice in a row:**



Old data when non-realtime thread reads twice in a row

→ Use NEW\_DATA flag to indicate new data is available

# Double Buffering

```
using FrequencySpectrum = std::array<float, 512>;  
  
enum { BIT_IDX = (1 << 0), BIT_NEWDATA = (1 << 1)};  
  
std::array<FrequencySpectrum, 2> mostRecentSpectrum;  
std::atomic<int> idx = {0};
```

Add a new bit "BIT\_NEWDATA" to the index variable

```
void processAudio (const float* buffer, size_t n)  
{  
    auto freqSpec = calculateSpectrum (buffer, n);  
  
    auto i = idx.load() & BIT_IDX;  
    mostRecentSpectrum[i] = freqSpec;  
    idx.store ((i & BIT_IDX) | BIT_NEWDATA);  
}
```

```
void updateSpectrumUIButtonClicked()  
{  
    auto current = idx.load();  
  
    if ((current & BIT_NEWDATA) != 0)  
    {  
        current = (current & BIT_IDX) ^ 1;  
        idx.store (current);  
    }  
  
    displaySpectrum (mostRecentSpectrum[(current & BIT_IDX) ^ 1]);  
}
```