



Aeron Transport Selector

Optimizing CPU Utilization

Aeron's approach of continuous CPU polling and immediate message processing sets the standard for high-performance messaging. However, continuous CPU usage can present a challenge for applications with less frequent workloads. Despite their sporadic activity, these applications persistently consume CPU resources by continuously polling for work.

Introducing Aeron Transport Selector

Aeron Transport Selector enables applications to enter a 'sleep' mode when there are no pending messages in their subscriptions, thereby saving the CPU from spinning and wasting CPU cycles. The application is 'woken up' for processing by the OS, as soon as a new message arrives. Although this may cause a minor latency, it's a reasonable compromise for applications with low data rates, particularly when there are multiple application subscriptions. The Aeron Selector provides a more resource-efficient and cost-effective solution for managing data in low-activity applications.

- + Save CPU cycles by eliminating the need for constant CPU polling.
- + Enhance the efficiency of data processing by performing reads on a set of subscriptions within a specified timeout.
- + Take a tailored approach to resource management
The Aeron client can be instantiated multiple times within the application, allowing for a mix of streams—some using the selector client and others not—to optimize latency.

AeronSelector consists of two major components:

- AeronSelector Daemon:** A single-threaded application daemon that uses the Aeron C API to determine if Subscriptions and Images have data to read, communicating with all of AeronSelector APIs in use for the specified Aeron media driver.
- AeronSelector API:** A language-specific API for interacting with the AeronSelector daemon to determine whether data is ready to be read and processed.

By  Adaptive

Adaptive builds & operates bespoke trading technology solutions across asset classes for financial services firms wanting to own their tech stack to differentiate and compete in the long-term. Central to Adaptive's offering is Aeron, the global standard for high-throughput, low-latency and fault-tolerant trading systems - the open-source technology supported and sponsored by Adaptive.

Technical Details

Usage assumptions and restrictions:

- + All Subscriptions within an Aeron client instance use the same Aeron Selector, with a 1:1 mapping between client and selector instances.
- + All Subscriptions and Images using an Aeron Selector share the same application thread for data availability notifications and processing.
- + Aeron Selector is not thread-safe nor designed to be called from multiple threads.
- + Aeron Selector may introduce some latency.

Operational Considerations

- Available as an Aeron Premium feature.
- Supported in the Aeron C and Java driver.
- Compatible with Linux (Ubuntu, RedHat).
- Supports C/C++ & Java clients.

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