Architectural Overview of PX4

PX4 consists of two main layers: The [PX4 flight stack](https://dev.px4.io/en/concept/flight_stack.html), an autopilot software solution and the [PX4 middleware](https://dev.px4.io/en/concept/middleware.html), a general robotics middleware which can support any type of autonomous robot.

All [airframes](https://dev.px4.io/en/airframes/architecture.html), and in fact all robotic systems including boats, share a single codebase. The complete system design is [reactive](http://www.reactivemanifesto.org/), which means that:

* All functionality is divided into exchangeable components
* Communication is done by asynchronous message passing
* The system can deal with varying workload

In addition to these runtime considerations, its modularity maximizes [reusability](https://en.wikipedia.org/wiki/Reusability).

Architecture

The PX4 flight stack is a collection of guidance, navigation and control algorithms for autonomous drones. It includes controllers for fixed wing, multirotor and VTOL airframes as well as estimators for attitude and position.

The PX4 Middleware consists primarily of device drivers for embedded sensors and a publish-subscribe based middleware to connect these sensors to applications running the [flight controls](https://dev.px4.io/en/concept/flight_stack.html).

The use of the publish-subscribe scheme means that:

* The system is reactive: It will update instantly when new data is available
* It is running fully parallelized
* A system component can consume data from anywhere in a thread-safe fashion

Basic Structure of ArduPilot



