Conceptual Architecture of Apollo System

Group ArchiTiger

url:*https://www.youtube.com/watch?v=evYjKNFLBBI&ab_channel=PipiGiao*

Group Members Intro

- Leader:

  Poppy Li 20181706 (Evolution, Use Case#2, Naming Conventions)

- Presenter:

  Xuan Xiong 20147035 (Abstract, Introduction, Subsystem Breakdown, Subsystem Interactions)

  Yuen Zhou 20186821 (Use Case#1, Responsibilities among participates)

- Other Group members:

  Yingjie Gong 20144264 (Control & Data Flow, Conclusion)

  Wang Zhimu 20190758 (Lessons Learned)

  Baisheng Zhang 20094496 (Concurrency, Lessons Learned)

A brief Introduction to Apollo

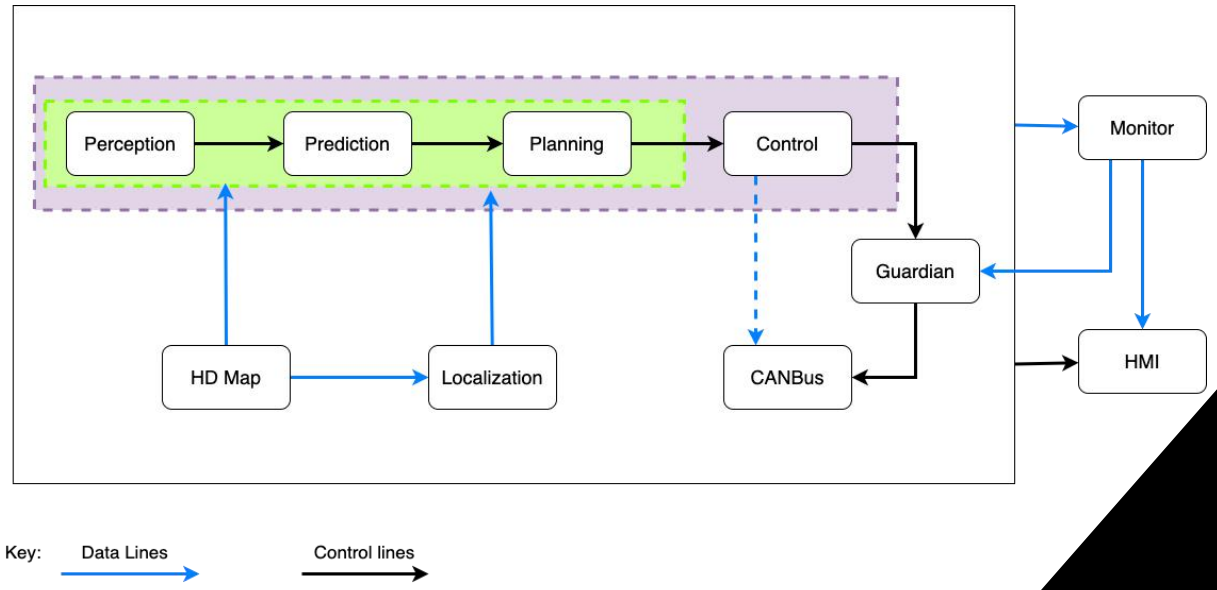
- Apollo System released by Baidu provides users Autonomous Driving solutions, it is an open-source platform which is available for all developers in Autonomous Driving field. Our presentation about the architecture will focus on its open software platform.

Architecture Style

- Publish-Subscribe Style with some layered style

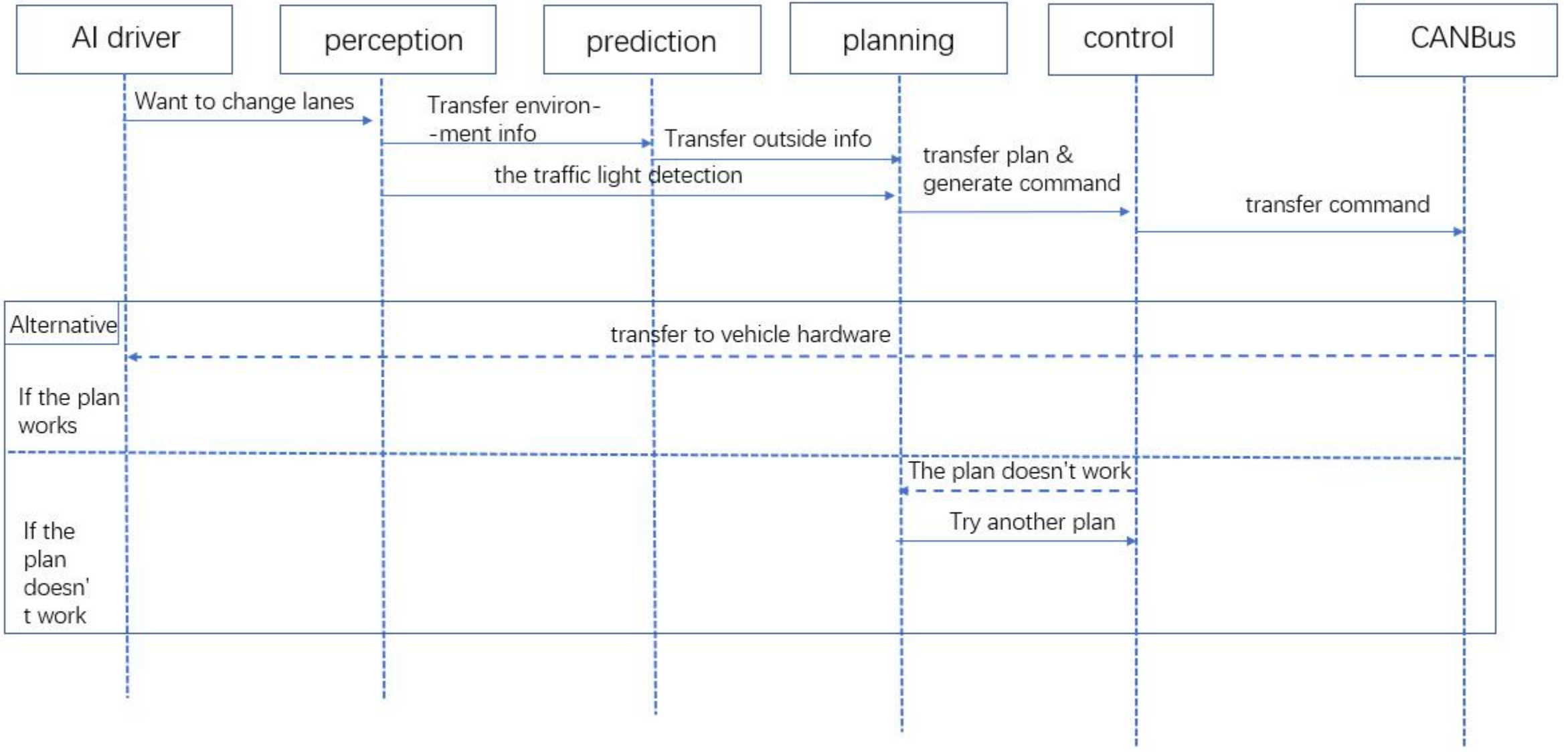
System Breakdown

- **Key components:**
- Perception Sys: Improves the accuracy of detection and recognition
- Prediction Sys: Predicts traffic conditions
- Planning Sys: Provides the Autonomous Driving plans
- Control Sys: Control the car
- Guardian: Intervene once the Monitor detects failure
- CANBus: Passing commands
- HD-Map: High Definition Map
- Localization Sys: Provides GPS localization
- Monitor: The surveillance of the system
- HMI: Human Machine Interface



Control & Data Flow

Use Case& Functionality



Concurrency

- Orchestration mode

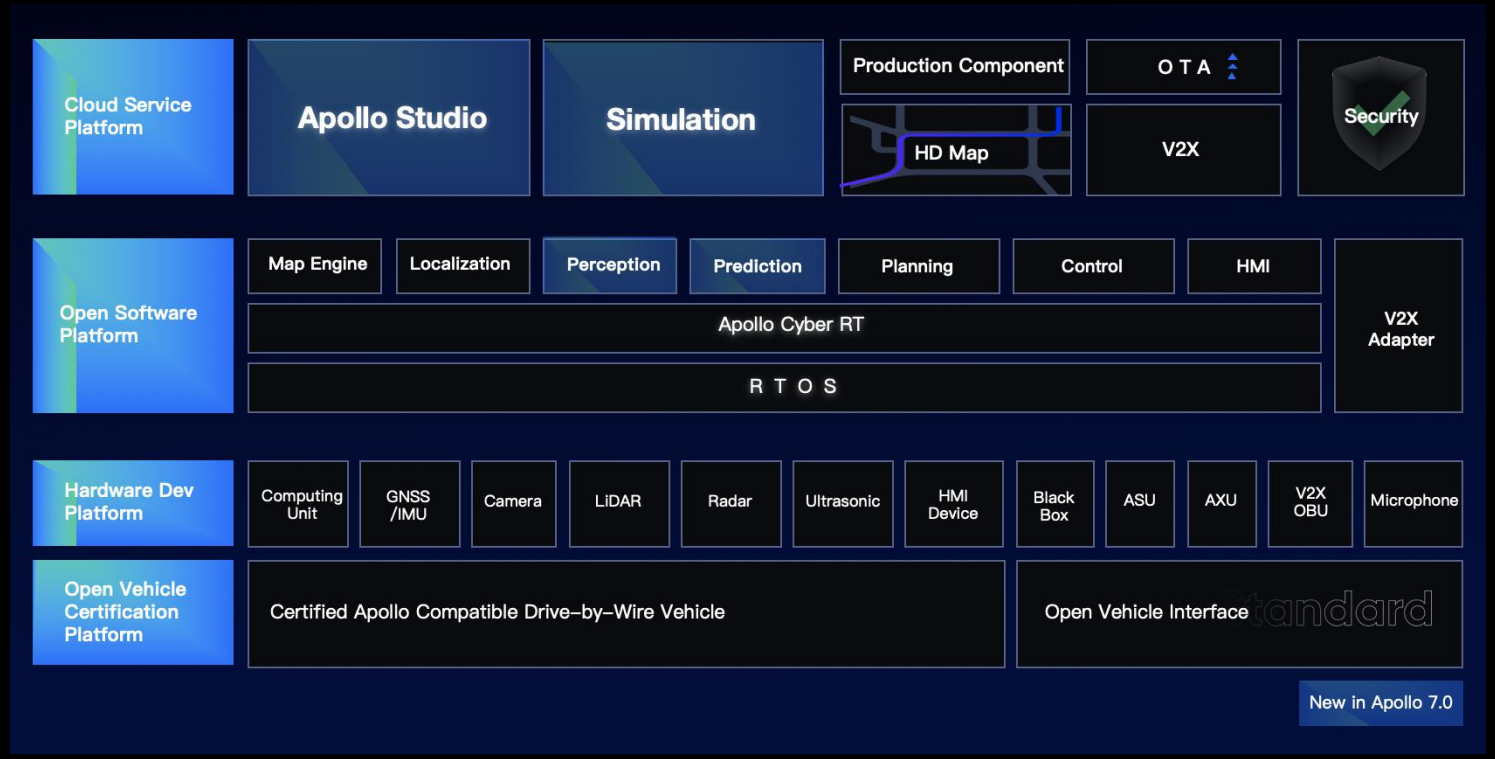
The scheduler can know in advance which tasks should be executed at this time, and will consider the priority.

- Classic mode

All processors share the task queue and execute tasks in a first-in, first-out manner. This strategy allows for better prioritization of tasks. Apollo also allows grouping of thread pools, which can divide processors into multiple groups, but tasks cannot be transferred between

Evolution of Apollo

Apollo v7


Cloud Service Platform
Apollo Studio
Simulation
Production Component
O T A
HD Map
V2X
Security
Open Software Platform
Map Engine
Localization
Perception
Prediction
Planning
Control
HMI
Apollo Cyber RT
R T O S
V2X Adapter
Hardware Dev Platform
Computing Unit
GNSS /IMU
Camera
LiDAR
Radar
Ultrasonic
HMI Device
Black Box
ASU
AXU
V2X OBU
Microphone
Open Vehicle Certification Platform
Certified Apollo Compatible Drive-by-Wire Vehicle
Open Vehicle Interface
New in Apollo 7.0

Packages

No packages published

Contributors 284

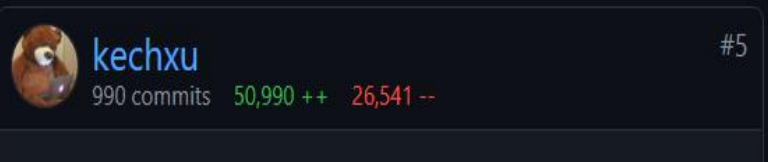
+ 273 contributors

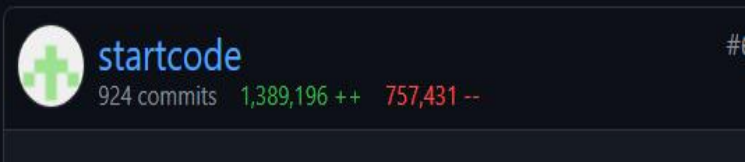
Environments 1

github-pages Active

Languages

- C++ 83.8%
- Python 5.0%
- Starlark 4.4%
- Shell 3.3%
- JavaScript 2.0%
- Cuda 0.9%
- Other 0.6%





SCENARIOS AND RISKS

CONCLUSION

THANK YOU!