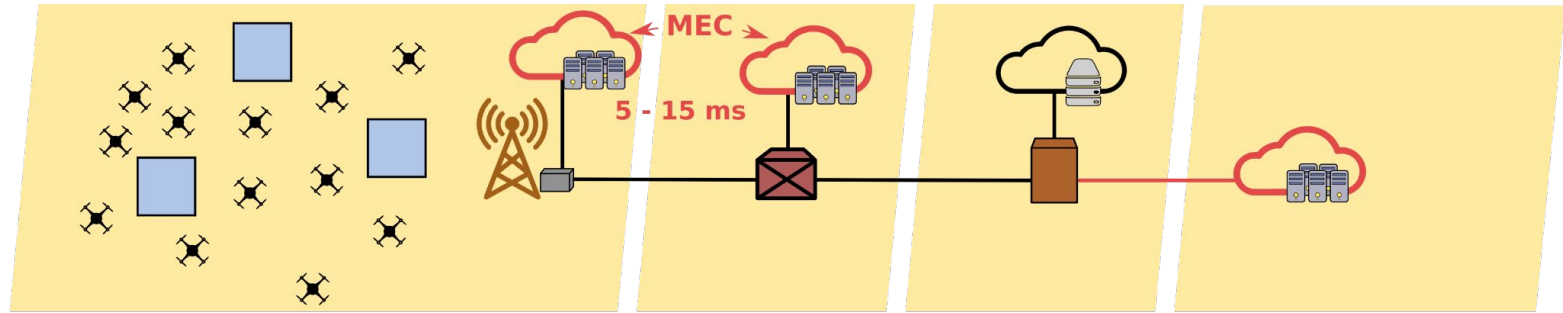




Quadcopter Implementation of an in-network Centralized Collision Avoidance Algorithm in Programmable Data Planes

**Fabricio E Rodriguez Cesen (UNICAMP), Géza Szabó (Ericsson Research),
Christian Esteve Rothenberg (UNICAMP),
Gergely Pongracz (Ericsson Research)**

Quadcopter Scenario



Access

Aggregation

Core

External network

0-50 m

0-10km

20-40 km

40-200 km

Remote location

50 - 200 us

2.2 ms

3.4 ms

9.4 ms

>10ms



Drone



Obstacle



Wlan/5G access



Base Station node



Transport node



Core node



Edge cloud

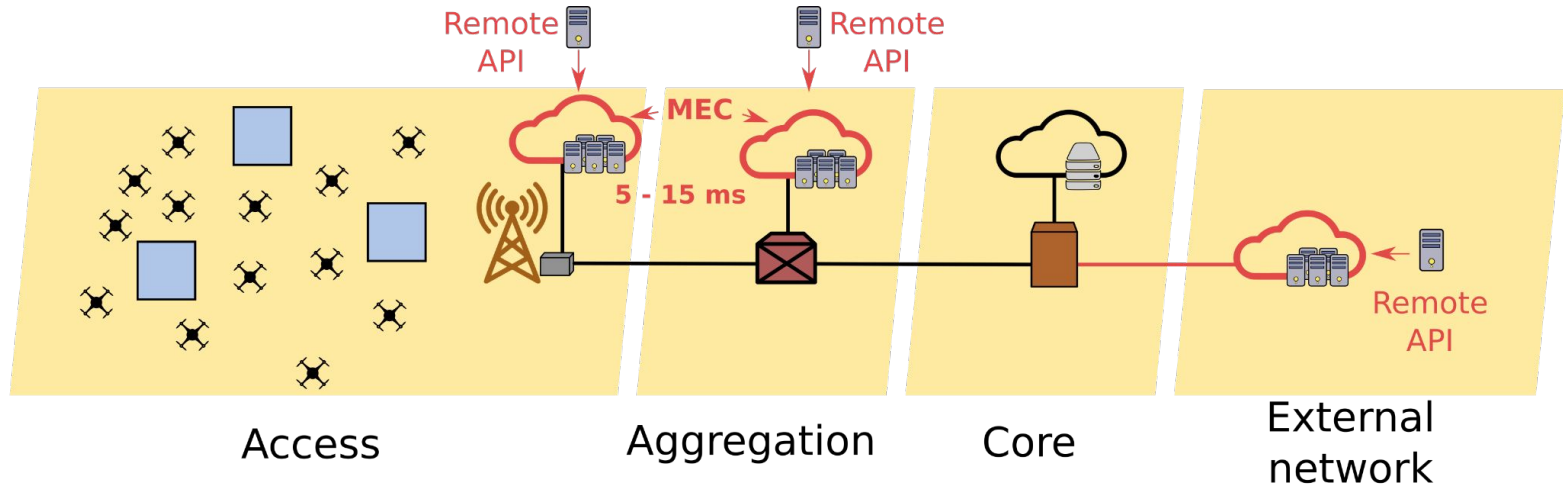


Core cloud



Remote cloud

Quadcopter Scenario

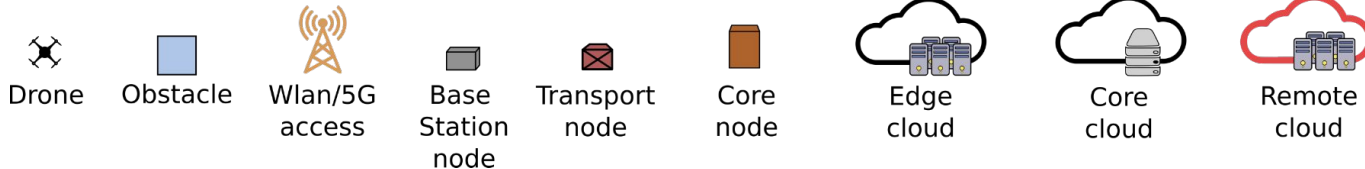
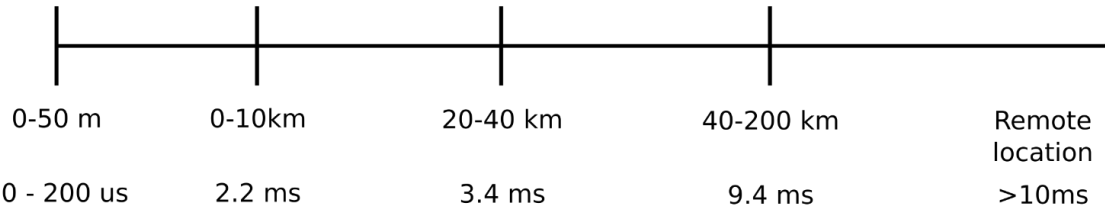


Access

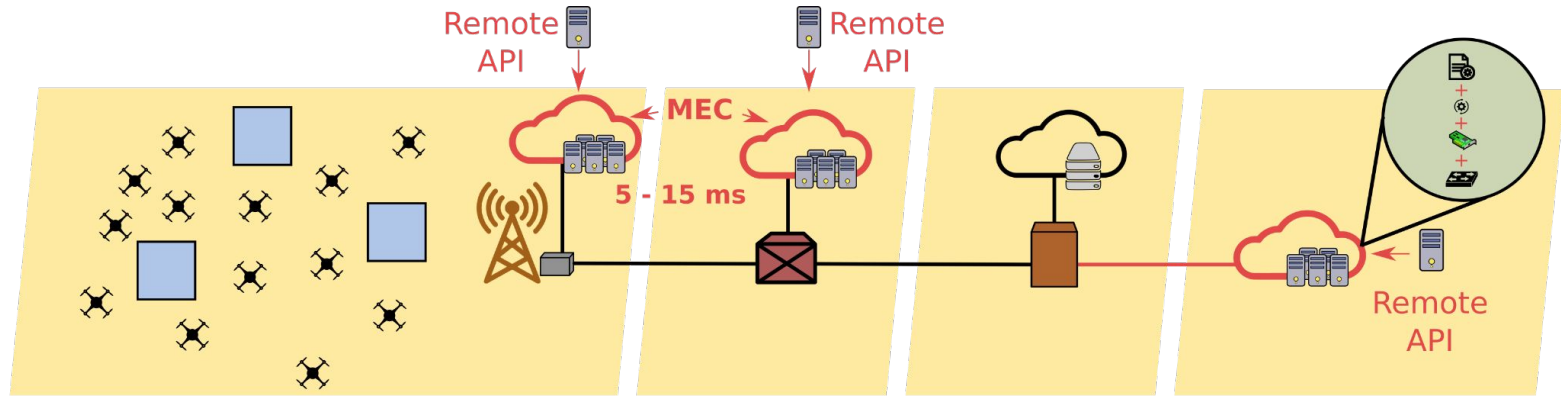
Aggregation

Core

External network



Quadcopter Scenario



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Core node



Edge cloud

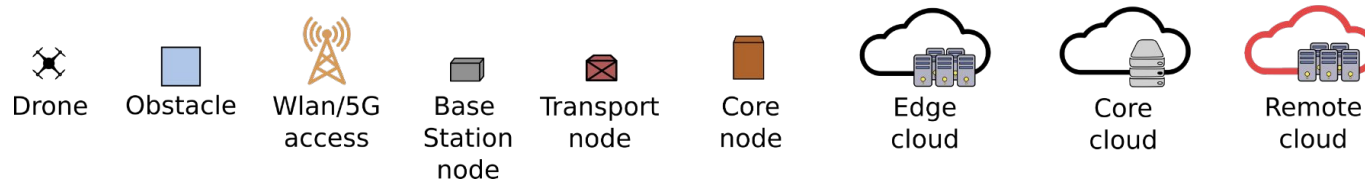
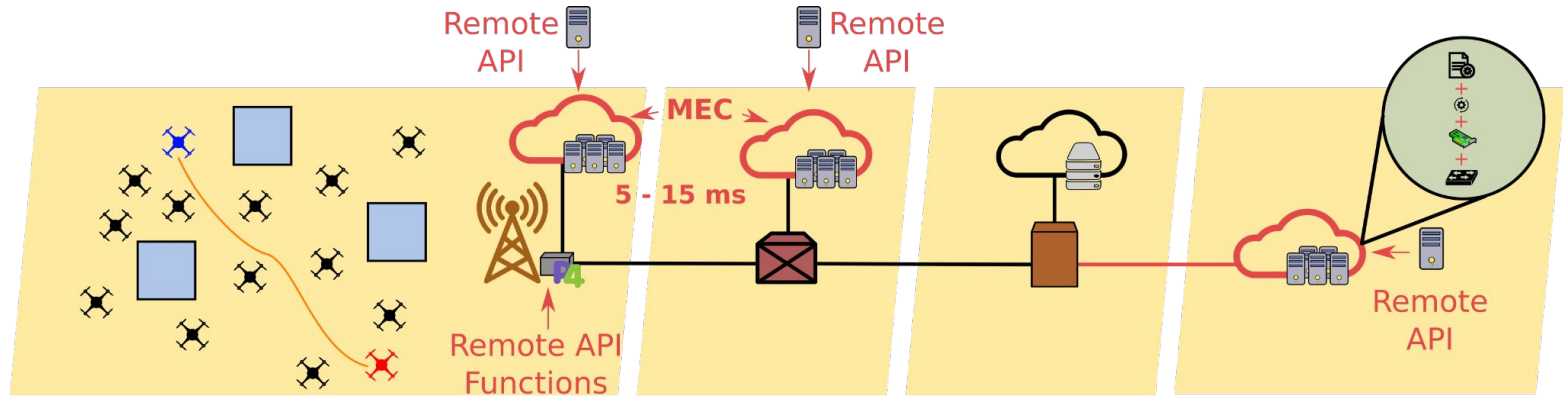


Core cloud

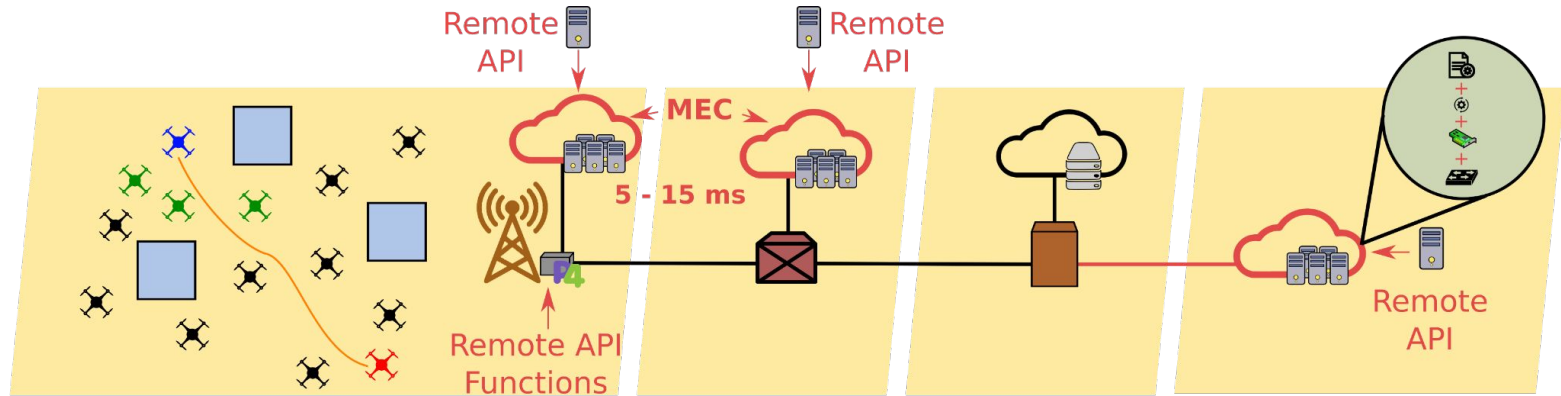


Remote cloud

Quadcopter Scenario

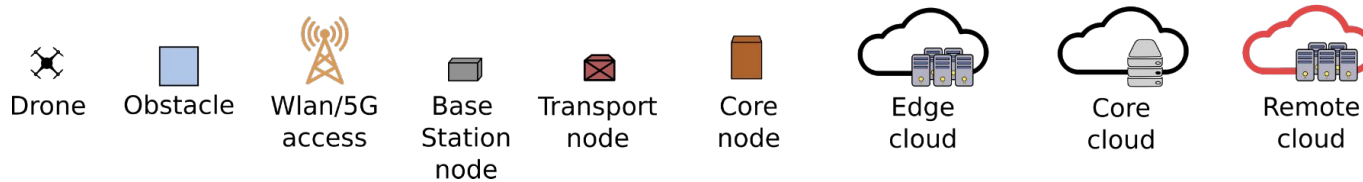


Quadcopter Scenario

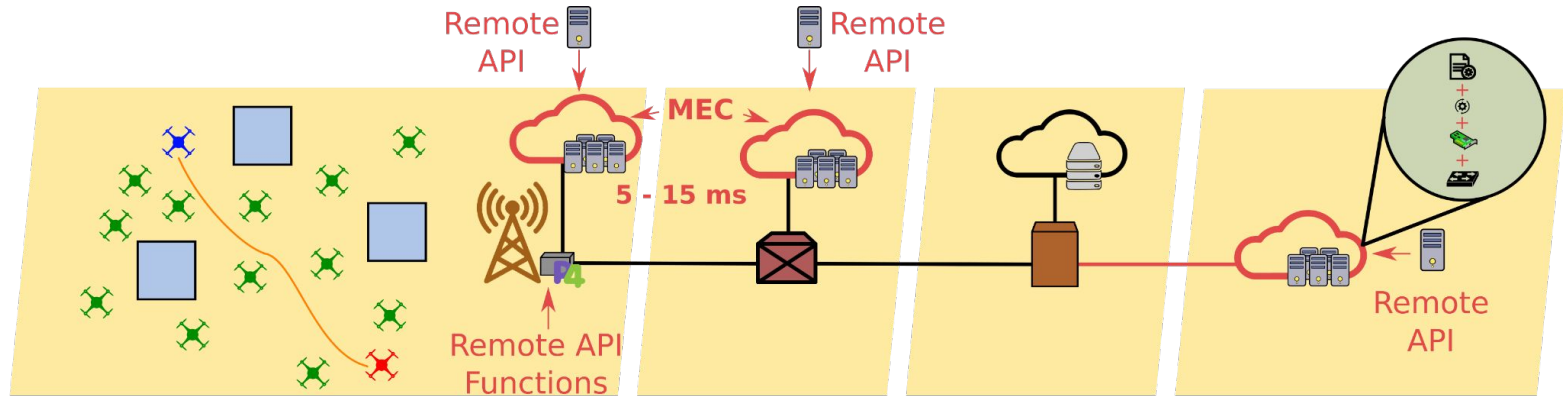


Distributed

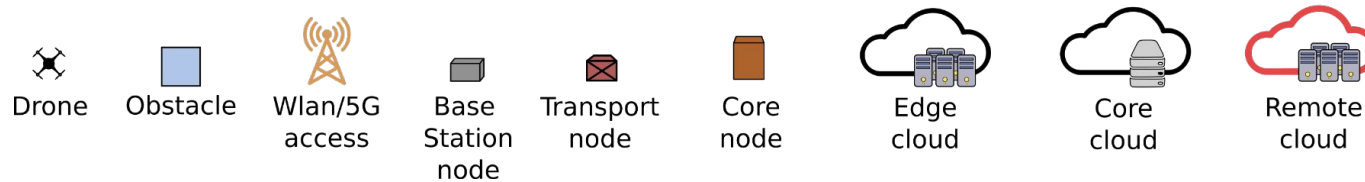
Population Size	■	■	■	■	■
Homogeneity	■	□	□	□	□
Scalability	■	■	■	■	■
Environment	■	□	□	□	□
Bandwidth	■	□	□	□	□



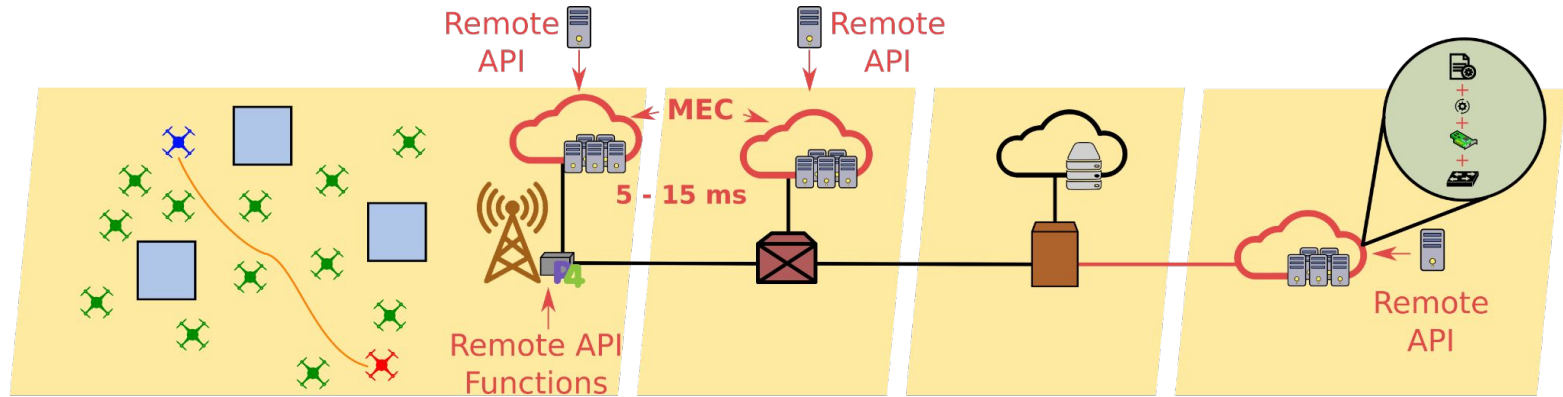
Quadcopter Scenario



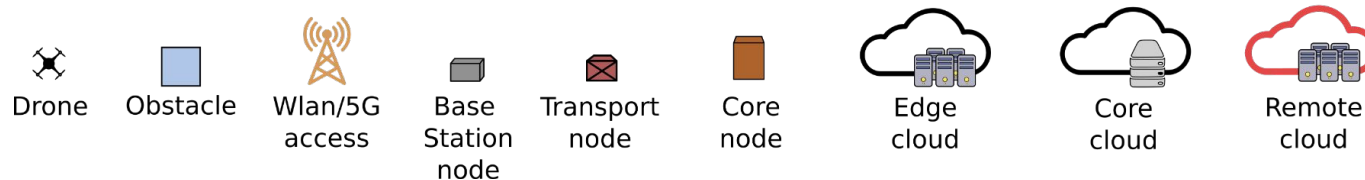
	Distributed	Centralized
Population Size	Red	Red
Homogeneity	Red	Red
Scalability	Red	Red
Environment	Red	Red
Bandwidth	Red	Red



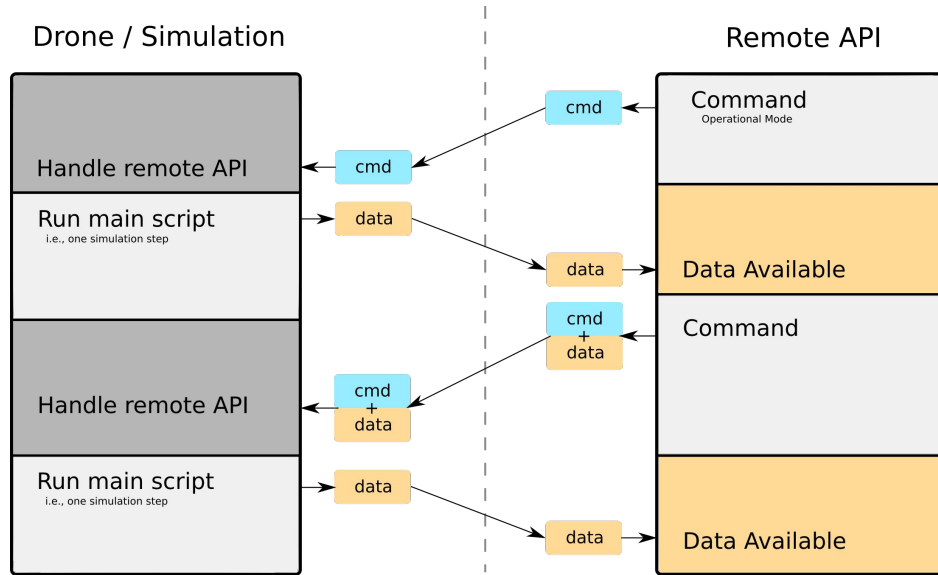
Quadcopter Scenario



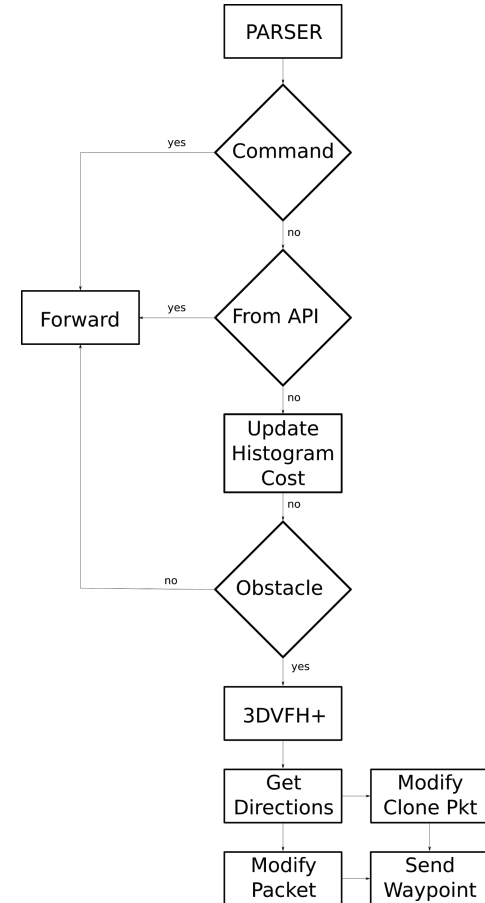
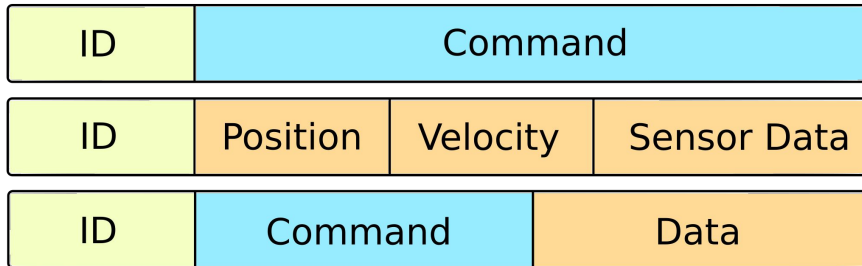
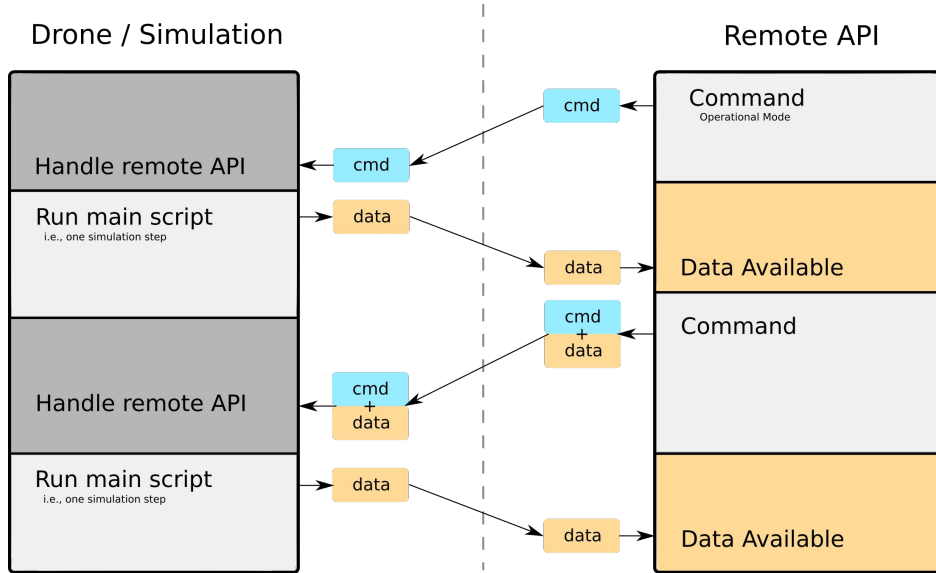
	Distributed	Centralized	Centralized with P4
Population Size	■ ■ ■ ■ ■	■ ■ ■ ■ ■	■ ■ ■ ■ ■
Homogeneity	■ ■ ■ ■ ■	■ ■ ■ ■ ■	■ ■ ■ ■ ■
Scalability	■ ■ ■ ■ ■	■ ■ ■ ■ ■	■ ■ ■ ■ ■
Environment	■ ■ ■ ■ ■	■ ■ ■ ■ ■	■ ■ ■ ■ ■
Bandwidth	■ ■ ■ ■ ■	■ ■ ■ ■ ■	■ ■ ■ ■ ■



Drone/Remote API communication



VFH+ avoidance algorithm



References

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Thank You

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