

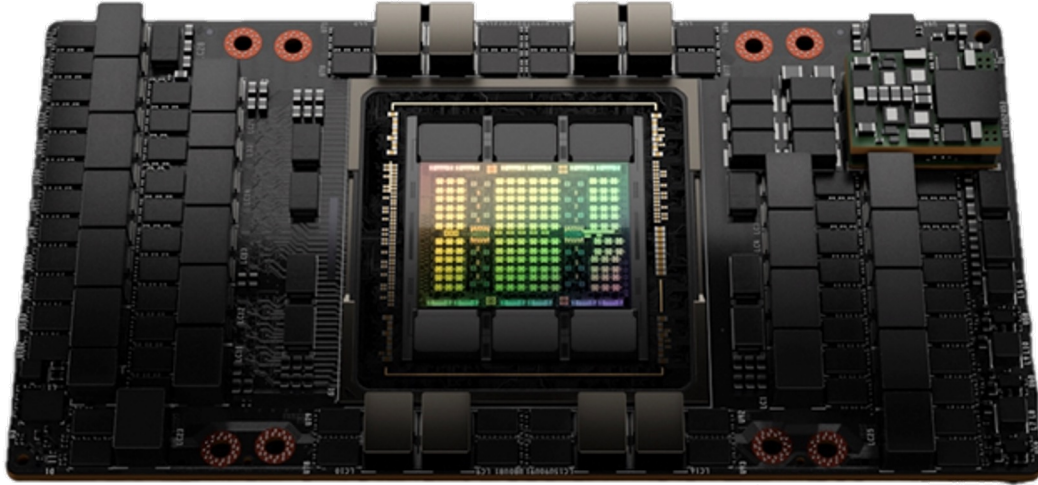
# Leveraging Cloud Computing to Make Autonomous Vehicles Safer

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# NVIDIA H100 GPU



*Image courtesy of NVIDIA.*

- **Cutting-edge GPU**
- **Trains powerful ML models**
- **Costs \$30,000**

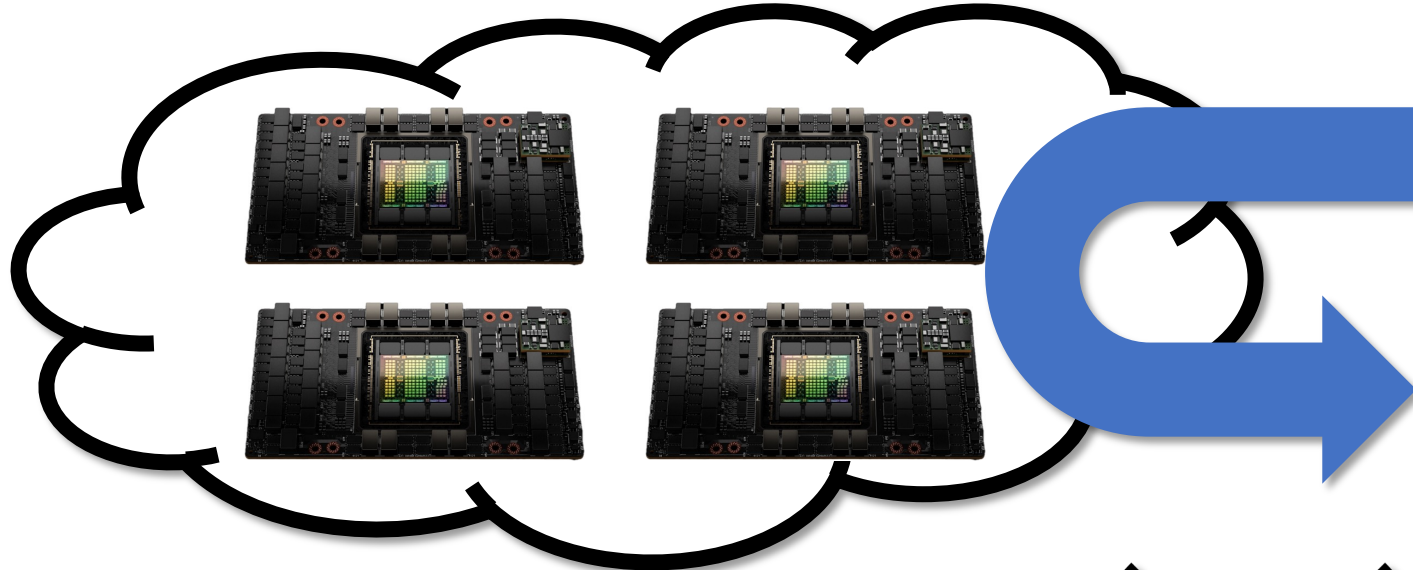
# Tesla Model 3



*Image courtesy of Tesla.*

- **EV with limited self-driving capabilities**
- **Software updates**
- **Costs \$30,000**

# Datacenter of GPUs



*Image courtesy of NVIDIA.*

# Fleet of Vehicles



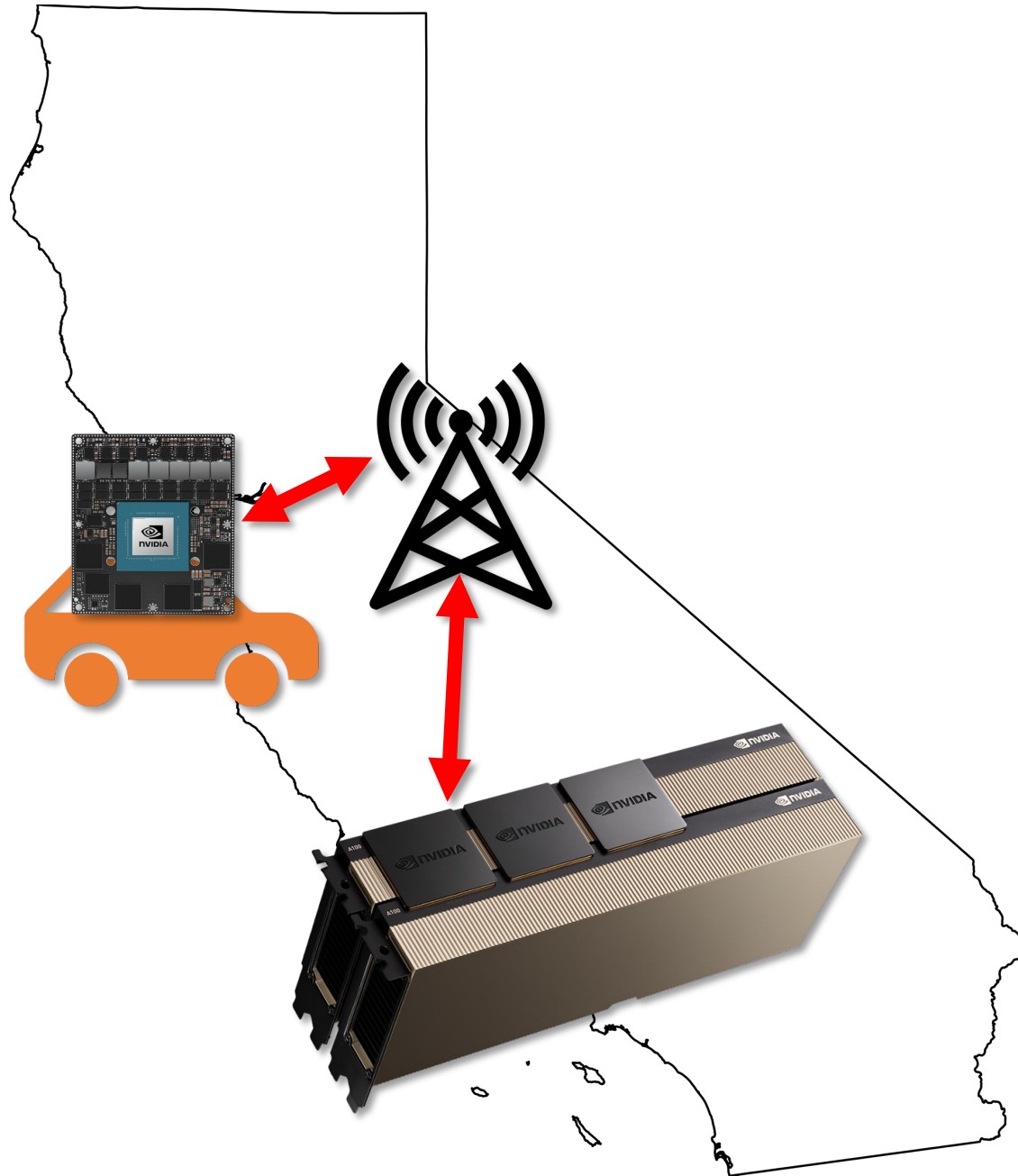
*Image courtesy of Tesla.*

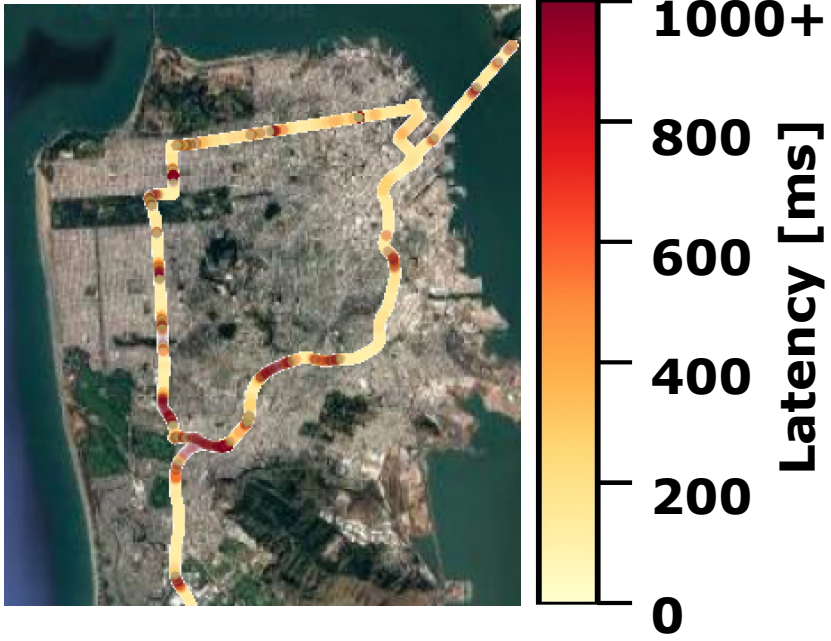


**Challenge #1:  
Latency**



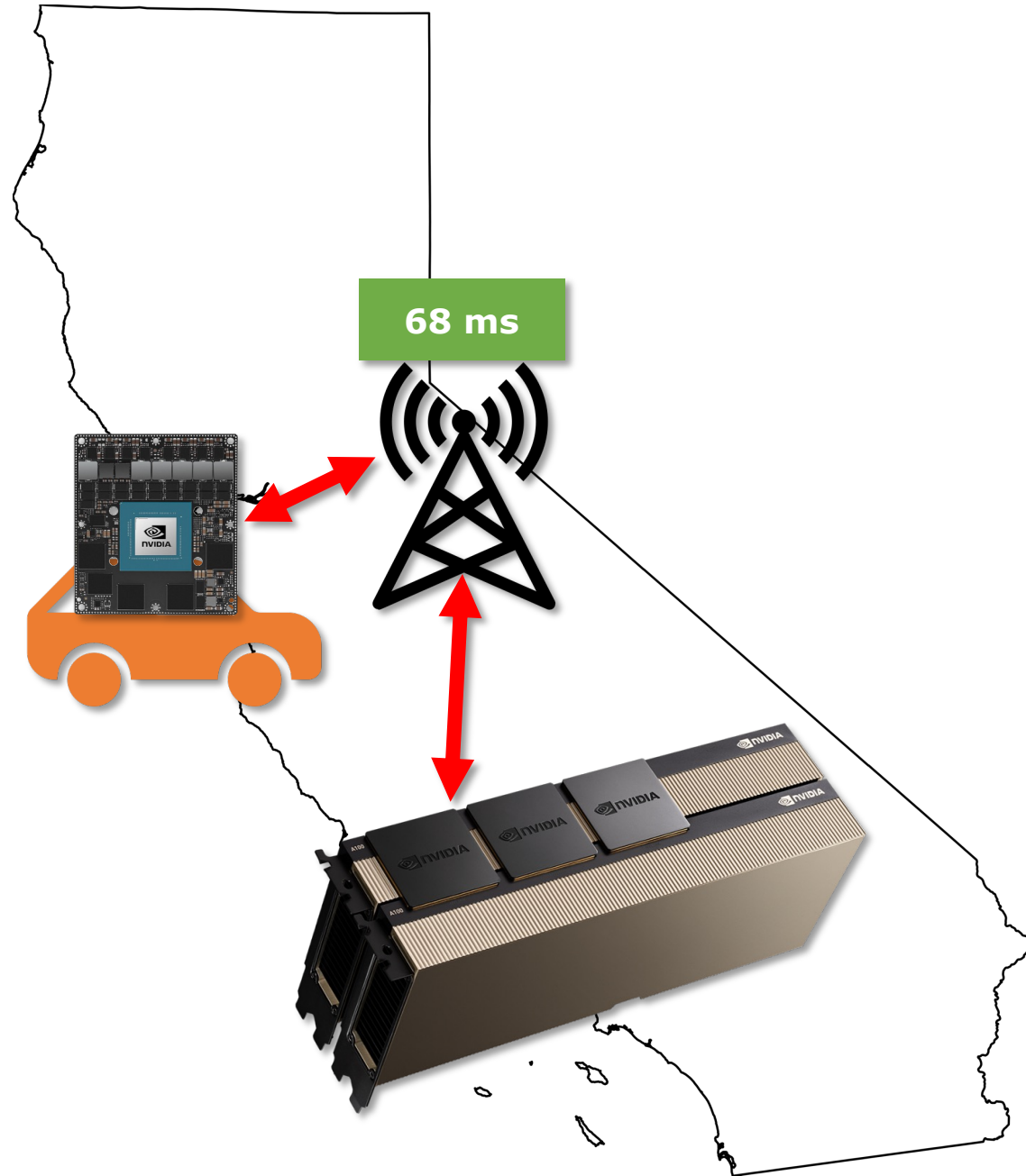
**Challenge #2:  
Reliability**



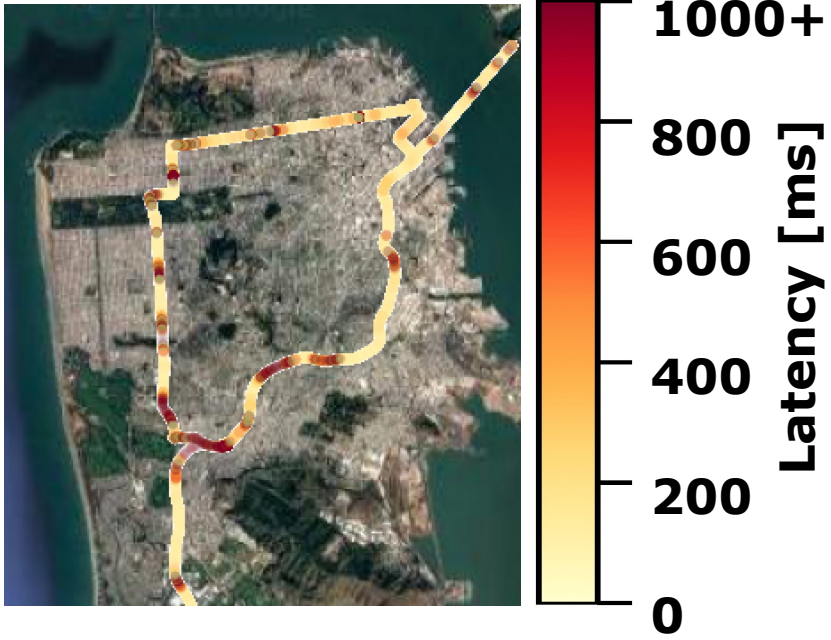


## Round-trip latency to cloud:

- **Median: 68 ms**

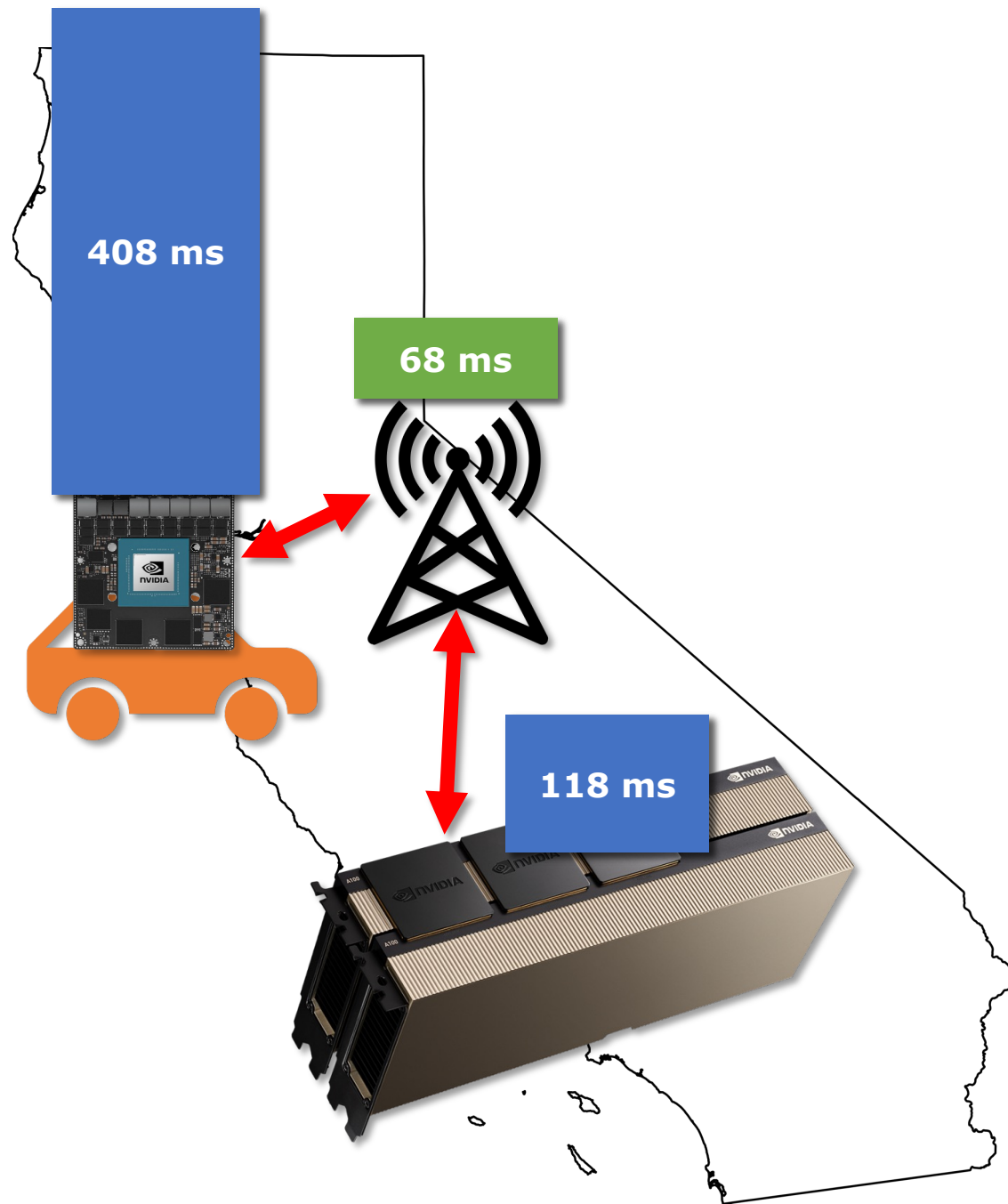


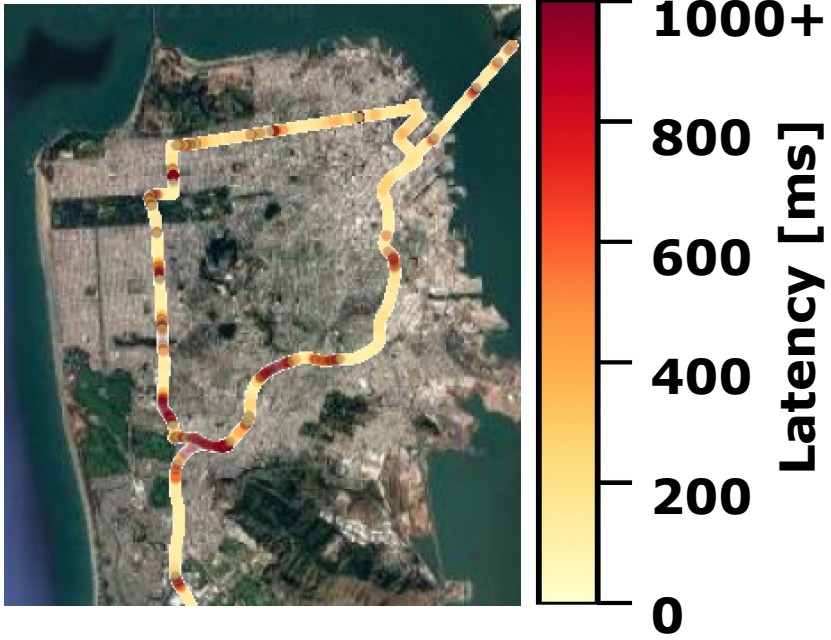




## Round-trip latency to cloud:

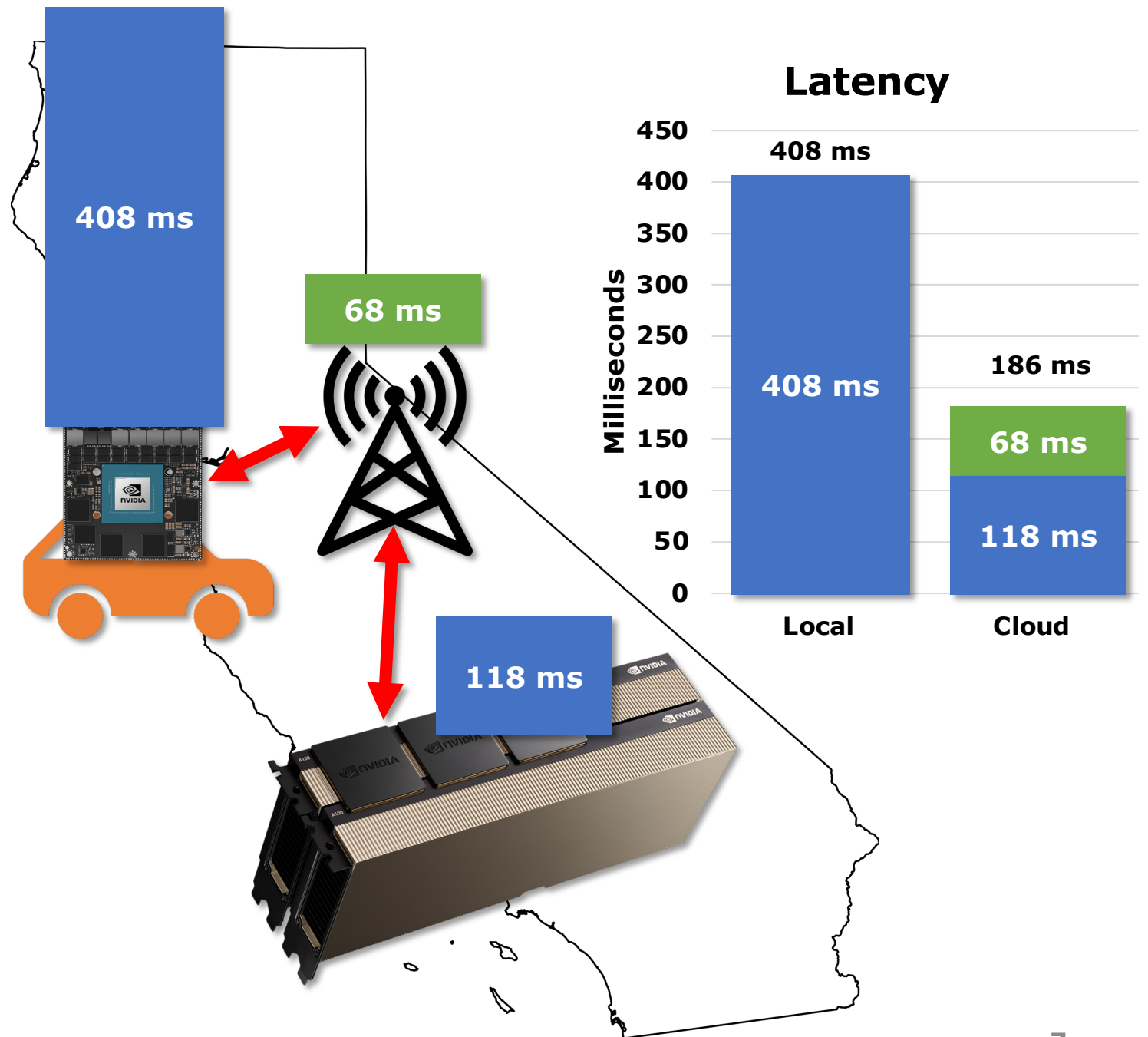
- **Median: 68 ms**

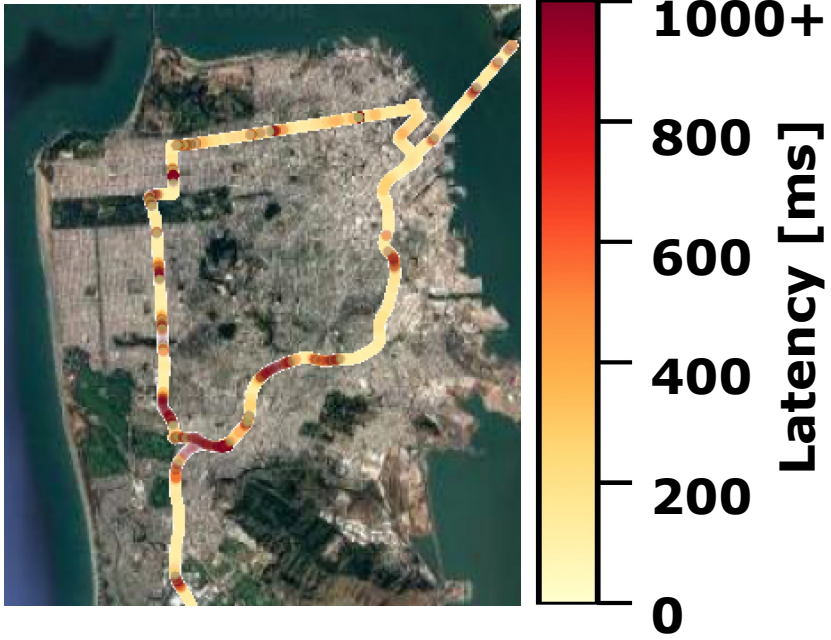




## Round-trip latency to cloud:

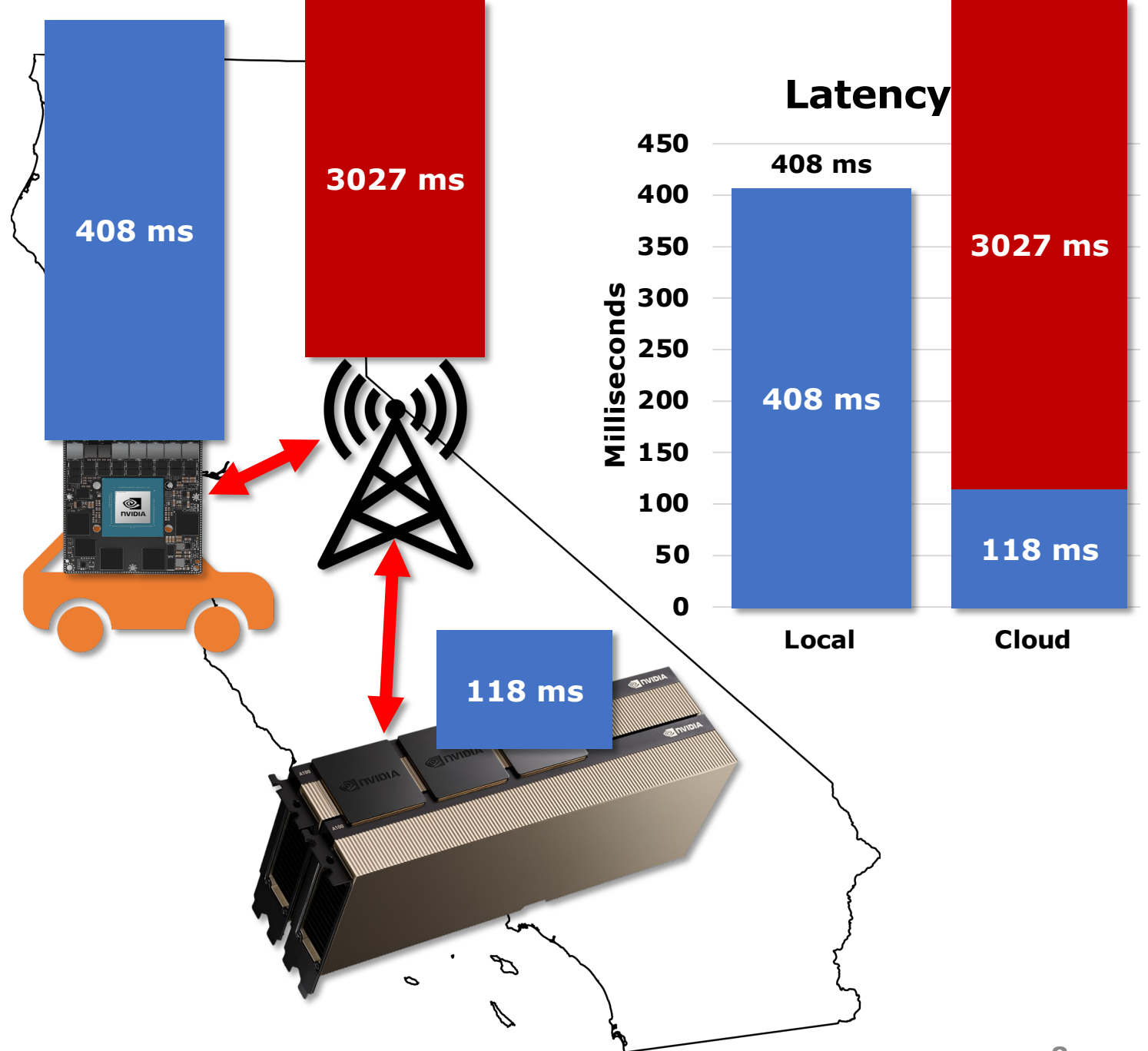
- **Median: 68 ms**





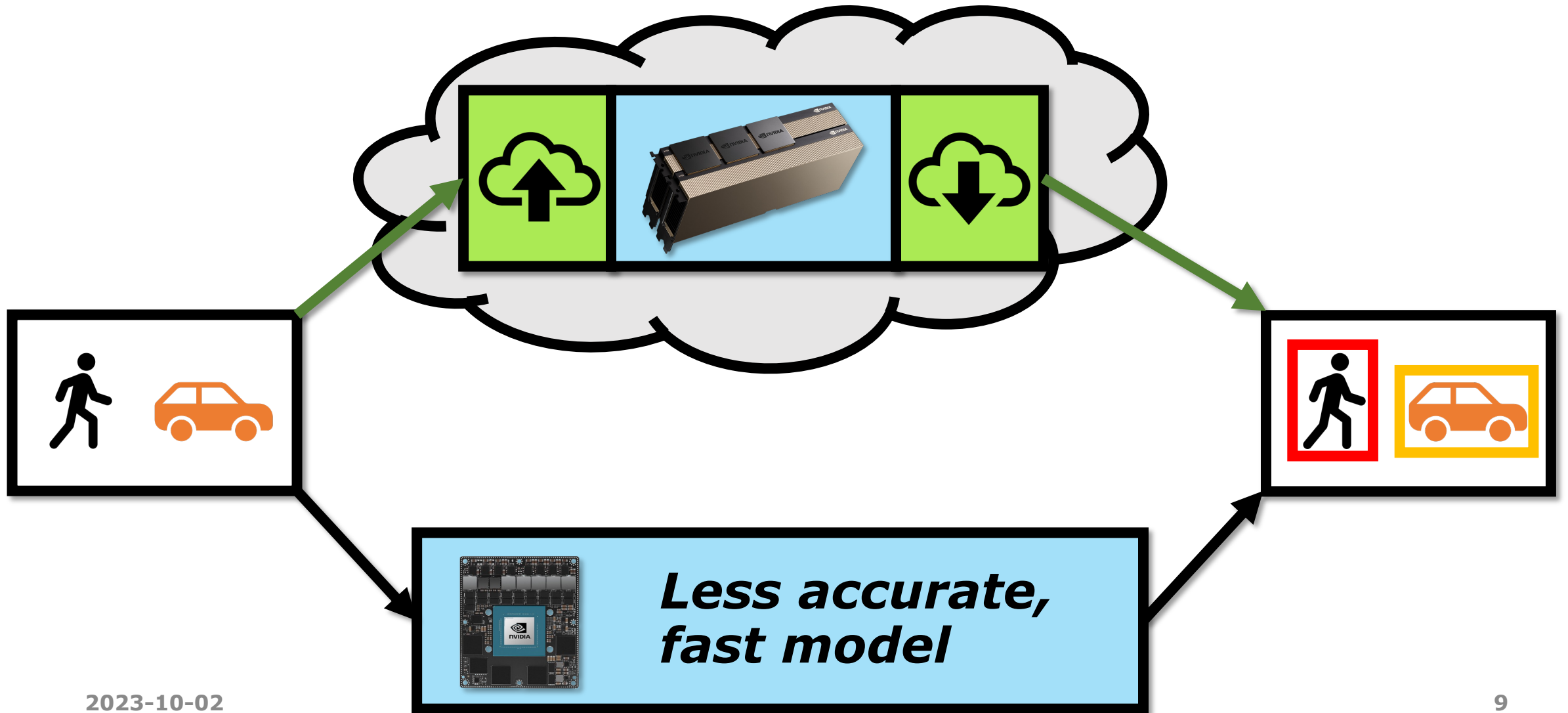
## Round-trip latency to cloud:

- **Median: 68 ms**
- **99<sup>th</sup> percentile: 3027 ms**

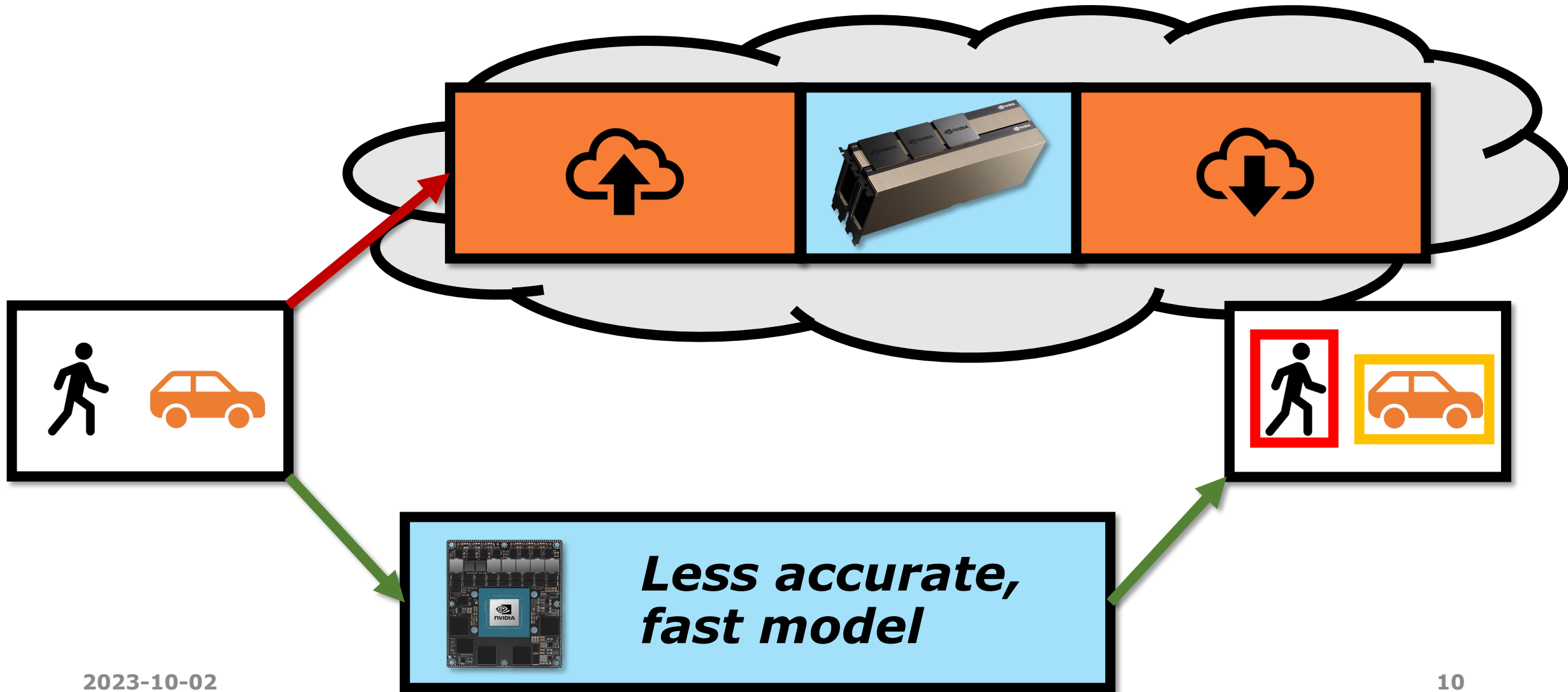




# Speculative Cloud Execution



# Speculative Cloud Execution



# AVs should use the cloud!

- **Large pool of powerful resources at low cost**
- **5G networks are good enough**
- **Use our speculative approach to handle reliability**



**Read the paper:**



**[tinyurl.com/cloud-avs](https://tinyurl.com/cloud-avs)**



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