As seen in the figure, cloud offloading can result in significantly larger delays compared with local processing in those cases in which the remote servers are located far away from the vehicles (i.e., USA and Asia). By contrast, cloud alternatives located closer to the vehicles provide acceptable latencies (i.e., Europe). It is MEC, however, the only approach that delivers suitable latencies for delay-sensitive applications, such as autonomous driving. Nevertheless, it should be noted that the average latency of the ME Host can be larger than that of the cloud depending on their respective loads at a given point in time. In this situation, the MEC Platform Manager can decide to allocate new requests into the cloud instead of the ME Host for latency minimization.

VI. Conclusions

This work aims at lowering the barrier for deploying autonomous and assisted driving applications and services in MEC environments. To this end, we leverage a lightweight MEC platform that converges SDN and NFV concepts into a single solution capable of supporting the tight latency and reliability requirements of this type of applications. Our solution builds upon lightweight computing and networking virtualization technologies such as Docker and Click. A proof-of-concept implementation has been introduced and validated in a practical use case, namely computer vision offloading. The results of the evaluation show that it is possible to use our platform to deploy computer vision applications. Moreover, this work allows to understand how to distribute the various elements of an autonomous and assisted driving application across vehicle, edge, and centralized clouds. As future work, we aim at extending this architecture by adding the ability to orchestrate and dynamically offload multiple service components characterized by different performance and latency requirements between MEC and cloud.

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