Application Driven Network: To Guarantee Quality of Experience with Self Learning

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Abstract:

Application Driven Network (ADN) is a new paradigm that provides on-demand differentiated services for applications. The basic idea of ADN is to slice the network into various logically isolated sub-networks. Each network slice can have its own network architecture and protocol to satisfy specific requirements of applications. ADN enhances the overall user experience while keeping the resource efficiency by further imposing multiplexing among these logically isolated sub-networks.

By automatically identify applications and learning application requirements on the network, ADN measures and analyzes the traffic pattern of each application using machine learning techniques. By constructing a self-learning multi-dimensional network slicing model, the optimal number of slices, application classification, and network resource allocation are determined automatically.

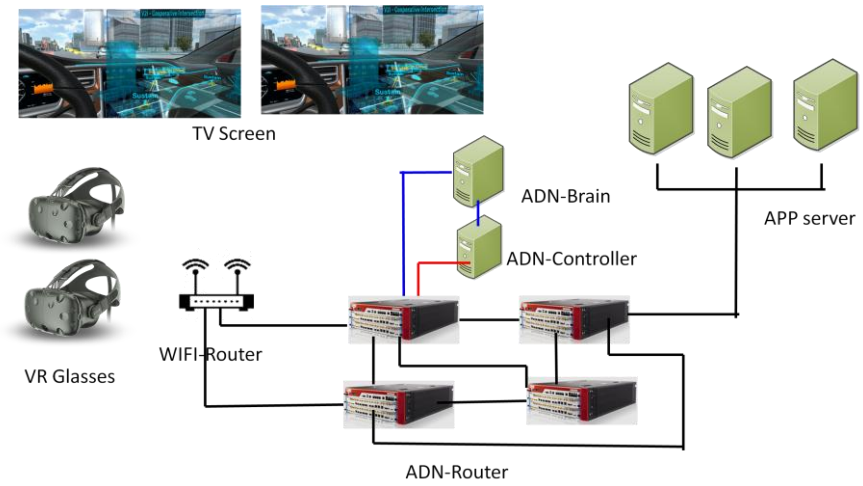

Fig1 ADN VR demo system framework

ADN provides fast and slow controls for network resources with respect to time, space, and value, etc. A fast controller in client and router conducts real-time measurements over fast varying parameters such as the queues in switches and link states, Slow controller in the brain controls each slice at the optimal control point with the minimal cost. Each slice can have its own application driven protocol to satisfy the specific requirements in the slice. A slow controller takes slow varying parameters such as network topology and global traffic matrix as inputs, and determines the optimal network slicing and operating points over time. With both the fast and slow controllers, the global network can operate at the optimal control point, fulfilling the services with respect to applications.

In this demo, we will demo how ADN works by VR application. The very low latency and high throughput will be achieved by ADN system with high network utility. To best of my knowledge, this is the first industrial self learning VR sys in the world.