Mobile Edge Clouds

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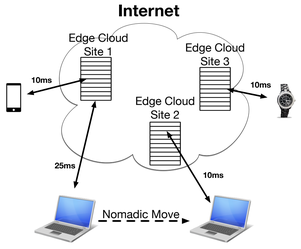
Background

- Traditional cloud computing approaches rely on a handful of global datacentres.
- This results in higher latencies for some users that are further away from the data centre location.
- These higher latencies can be unsuitable for IOT workloads and mobile applications.

Traditional Global Data Center Arrangement



An Edge Cloud w/ Lower Customer Latencies

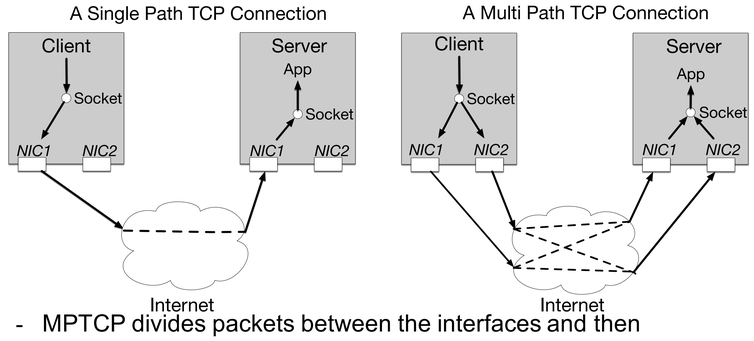
What is a Mobile Edge Cloud?

- In a mobile edge cloud(MEC), we move resources to the edge of the network, closer to the user.
- Rather than several large central datacentres, hundreds of thousands of edge nodes are deployed with smaller provisioned resources.
- Allows resources to be closer to users and provide lower latencies to customers.

Applications for Mobile Edge Clouds

- Processing for Augmented Reality can be offloaded with low latency
- IOT devices can send data to nearby edge cloud for processing
- Connected Cars and Drones can run vision and sensor workloads at nearby edge nodes.
- Mobile devices can take advantage of machine learning workloads with low latency.

Multi-Path Transport Protocols



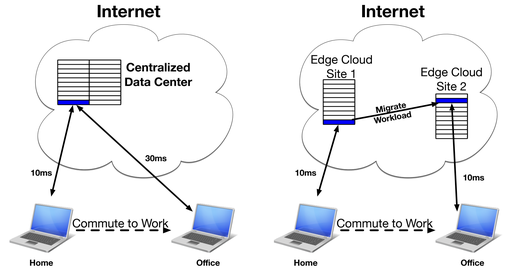
- MPTCP divides packets between the interfaces and then recombines them at the destination host.
- When congestion is detected on the network, MPTCP automatically shifts load away from one interface and towards the others.
- Allows users to switch between interfaces without dropping the network socket and thus losing your connection.

MPTCP in Mobile Edge Clouds

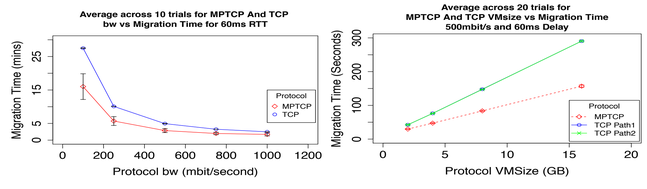
- MPTCP is well suited for mobile edge cloud environments.
- MEC clients likely to be mobile devices that have both cellular connection and wireless
- As users go in and out of wifi and cell coverage MPTCP maintains the connection preventing unnecessary downtime for users.

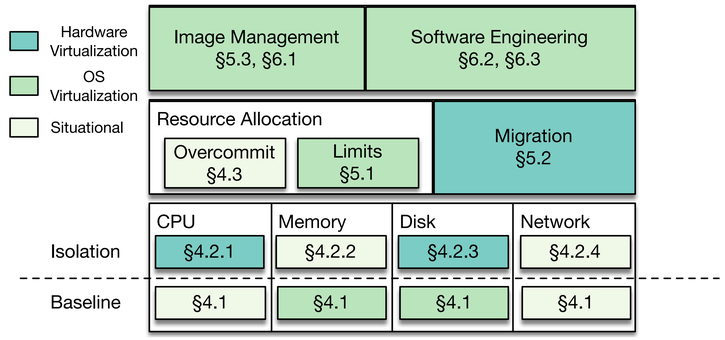
Migration in Mobile Edge Clouds

- MEC users are highly mobile, MEC's migrate workloads to the current closest location at any time.



- MPTCP allows us to speed up the migration process by using all available interfaces.





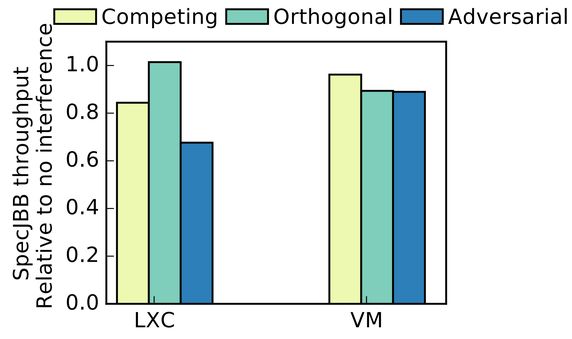
Performance of Virtualization Under Contention

Virtualization

- Traditionally two types of virtualization:
  - Operating System Based (Containers)
  - Hardware Based. (Virtual Machines)
- Containers are more light weight
- VM's are bulkier but more secure and provide isolation.

Virtualization in Mobile Edge Clouds

- Workloads are deployed using virtualization on mobile edge clouds
- Mobile Edge Clouds use smaller, less well-provisioned servers; so contention of resources and congestion may be a bigger problem then the global case.
- The decision of which type of virtualization platform to use depends on availability and expected demand/usage of resources.



VM's performance constant across interference times