Low Latency Gaming

Lilian Gallon, Xudong Guo, Cody Hartsook, Howard Ng, Collyn Noda, Alan Vasilkovsky

**Baskin Engineering UC SANTA CRUZ | CISCO**

Abstract

The Internet is not built for gamers. Internet service providers and massive corporations are constantly competing to get their information across faster than the rest. This means that connection issues that you may experience when gaming online are entirely out of your control. Our goal is to find a way to remedy this problem and create a better online experience.

An Internet Freeway?

Just like a freeway is built on top of existing roads for the purpose of expediting *vehicular* traffic, we want to create an **Overlay** which builds on the existing infrastructure of the internet for the purpose of expediting your *internet* traffic!
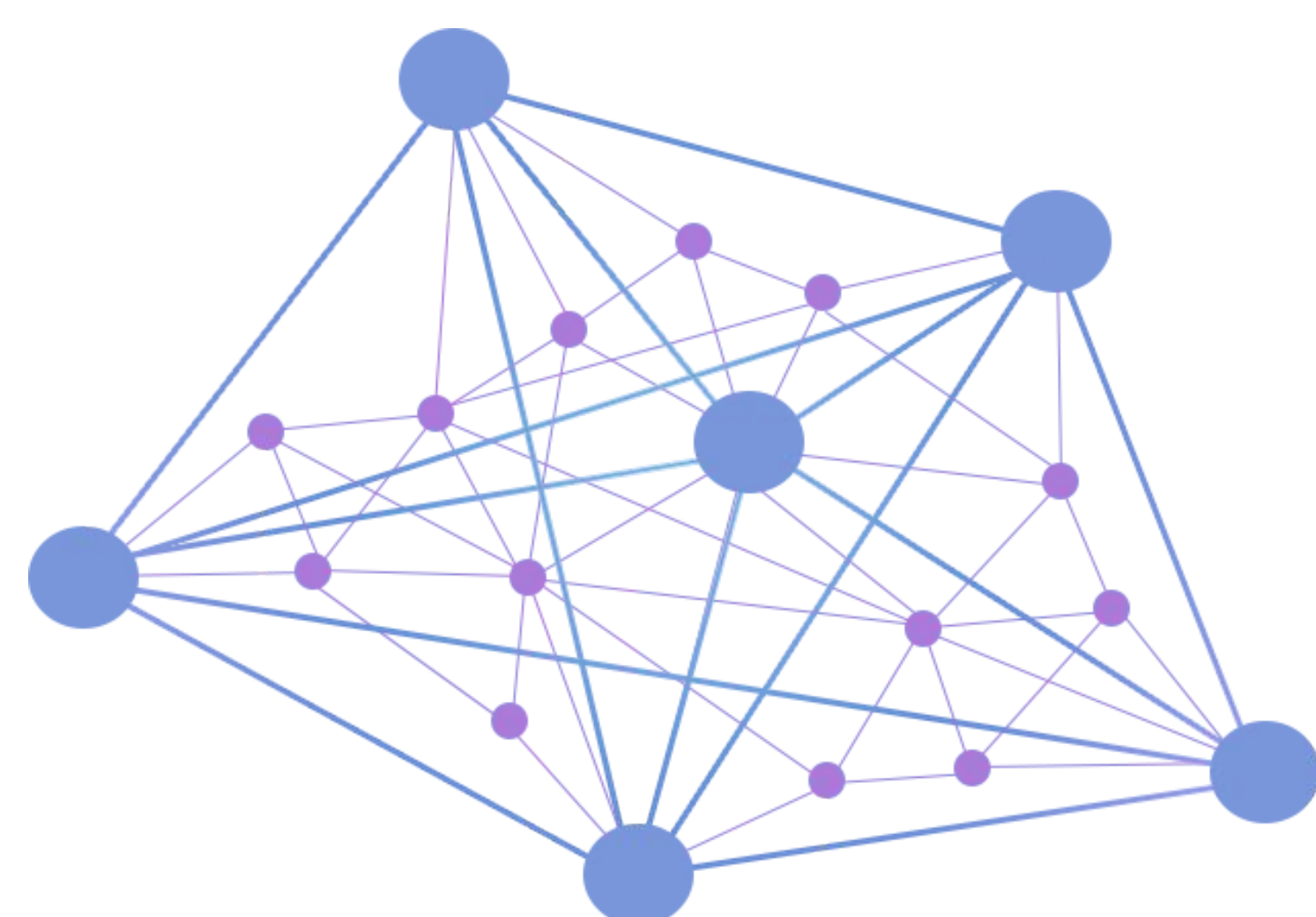
Jargon Check

Here are some of the metrics we use to measure internet connection performance:
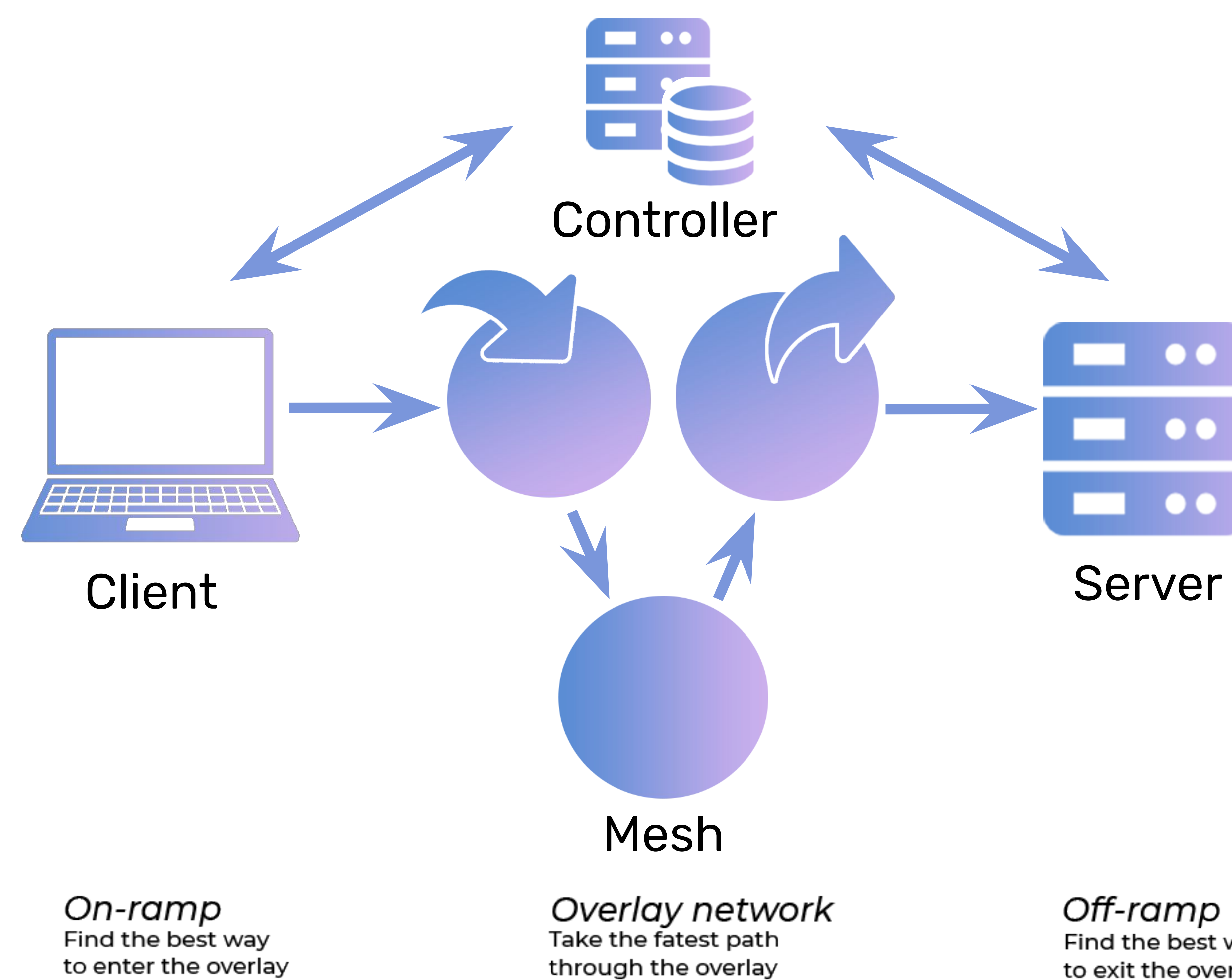
- **Latency** is the time that it takes for a packet, a chunk of data, to go from its source to its destination.
- **Jitter** is a measurement of the change in latency over time.
- **Packet loss** is a count of how many packets fail to reach their destination.

Overview

Our new **Overlay** network consists of four modules: **Client**, **Server**, **Mesh** and **Controller**. The **Client** and **Server** modules are applications which reside on the client and server machines, respectively. They watch for packets coming from a game or application. Instead of allowing these packets to follow their intended route, they are snatched up and sent to our network of **Mesh** nodes. The **Mesh** nodes act like relays, forwarding the packets along from node to node along a predetermined route. The **Controller** module is the brain behind the entire operation. It identifies optimal routes for packets to take, keeps an updated status of our **Mesh** nodes, and stores data so that it can be accessed by any module in the **Overlay**.

Controller

Client

Server

Mesh

On-ramp
Find the best way to enter the overlay

Overlay network
Take the fatest path through the overlay

Off-ramp
Find the best way to exit the overlay

Acknowledgments

Results

In the end, we created a working prototype of our **Overlay**, complete with all four modules. We also created two separate methods to gain access to the **Overlay** network: A Software Development Kit which developers can add directly into their games, as well as a native desktop application for the gamers.

A Scenario

You live in Los Angeles and you are playing the hot new online game: *First Person Shooter III*, which has a server located in Dallas. According to Cisco's projections, here are some of the improvements that you may experience **with** and **without** using our **Overlay** network**.**

Average Latency

33.8 ms	38.2 ms

Average Jitter

354 μs	414 μs

Average Packet Loss

0.03%	0.06%

The Effects

Lower latency, jitter and packet loss mean that gamers have to worry less about connection issues during crucial gameplay moments. All they have to do is make sure they are on top of their game.

Cisco recognizes that this new technology is useful for more than just gaming. Countless other applications and industries could benefit from these improvements in internet speed, connectivity and reliability.