Intel Cloud Orchestration Networking

Fall Progress Report

Abstract

This document outlines the progress of the Cloud Orchestration Networking project over the entirety of the fall term. It contains a short description of the project's purposes and goals, current progress, current issues, and any solutions to those issues. It also contains a week by week retrospective for all ten weeks of fall term.

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I. Project Goals

Our project is to first switch the Linux-created GRE tunnel implementation in Ciao to use GRE tunnels created by Open vSwitch. From that point we will switch the actual tunneling implementation from GRE to VxLAN/nvGRE based on performance measurements of each on data center networking cards. After this is completed, a stretch goal is to replace Linux bridges with Open vSwitch switch instances.

II. Purpose

The current implementation of Ciao tightly integrates software defined networking principles to leverage a limited local awareness of just enough of the global cloud's state. Tenant overlay networks are used to overcome traditional hardware networking challenges by using a distributed, stateless, self-configuring network topology running over dedicated network software appliances. This design is achieved using Linux-native Global Routing Encapsulation (GRE) tunnels and Linux bridges, and scales well in an environment of a few hundred nodes.

While this initial network implementation in Ciao satisfies current simple networking needs in Ciao, all innovation around software defined networks has shifted to the Open vSwitch (OVS) framework. Moving Ciao to OVS will allow leverage of packet acceleration frameworks like the Data Plane Development Kit (DPDK) as well as provide support for multiple tunneling protocols such as VxLAN and nvGRE. VxLAN and nvGRE are equal cost multipath routing (ECMP) friendly, which could increase network performance overall.

III. Current Progress

IV. Week by Week Reports

A. Weeks Zero Through Two

B. Week Three

C. Week Four

D. Week Five

E. Week Six

F. Week Seven

G. Week Eight

H. Week Nine

I. Week Ten

V. Fall Term Retrospective

Week	Positives	Deltas	Actions
3	this is a test	beep boop bap	Hack the world