DYNAMICALLY AGGREGATING SMART COMMUNITY SENSORS, EDGE AND CLOUD RESOURCES WITH OVERLAY VPNS

PRAGMA-33 LIGHTNING TALK

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WELCOME

- THIS PROJECT IS A CENTRA/PRAGMA COLLABORATION, AND IT FOCUSES ON NETWORK VIRTUALIZATION MIDDLEWARE THAT ALLOWS EDGE AND CLOUD RESOURCES TO BE LOGICALLY CONNECTED, ON-DEMAND, INTO COMMUNITY VIRTUAL PRIVATE NETWORKS (VPNS).

MOTIVATION

- SEVERAL FACTORS WHY IT IS NOT FEASIBLE TO ALWAYS MOVE FROM EDGE TO CLOUD.
  - THE BANDWIDTH DESIRED MAY NOT BE AVAILABLE
  - THERE IS A COST ASSOCIATED WITH BANDWIDTH
  - CLOUD DATA CENTERS ARE ONLY COARSELY DISTRIBUTED
    - MOST SENSOR NETWORKS WOULD BE GEOGRAPHICALLY DISTANT FROM AVAILABLE CLOUD.
  - APPLICATION LATENCY REQUIREMENTS WOULD BE DIFFICULT TO MEET
    - THE NUMBER OF ROUTING HOPS TYPICALLY INCREASE WITH DISTANCE BETWEEN ENDPOINTS.
  - CONTROLLING WHERE DATA IS SENT, HOW IT IS USED AND HOW LONG IT IS STORED.

USE CASE

- CONSIDER HYPOTHETICAL SCENARIO
- A CROWD-SOURCED EVENT OCCURRING AT THE NETWORKS EDGE BUT FINAL DECISIONS/ ACTIONS ARE MADE IN THE CLOUD
  - IDENTIFY A SPECIFIC AUTOMOBILE LICENSE PLATE WITHIN AN APPROXIMATE REGION
  - DETERMINE ITS DIRECTION OF TRAVEL
  - REPORT THE FINDINGS TO CENTRAL MONITORING APPLICATION.

GOALS

- RESEARCH AND DEVELOP THE INFRASTRUCTURE AND PLATFORM THAT ENABLES THESE APPLICATIONS
  - SIMPLIFY ADDRESSING AND CONNECTING NODES IN A WORK GROUP
    - FLATTENING THE ADDRESS NAMESPACE
    - FACILITATING MULTIPLE DIFFERENT, CONCURRENT OVERLAYS
  - SUPPORT PRIVATE COMMUNICATIONS BETWEEN PARTICIPANTS
    - ENCRYPTED TUNNELS
  - BUILD SCALABLE OVERLAY NETWORKS
    - PEER-TO-PEER LINKS
    - STRUCTURE OVERLAY TOPOLOGIES
  - PROVIDING APIS
    - PROGRAMMATIC USE BY THIRD PARTY APPLICATIONS.

THANK YOU

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