Internet-wide Geo-networking Problem Statement

draft-karagiannis-problem-statement-geonetworking-01

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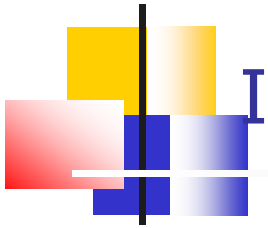
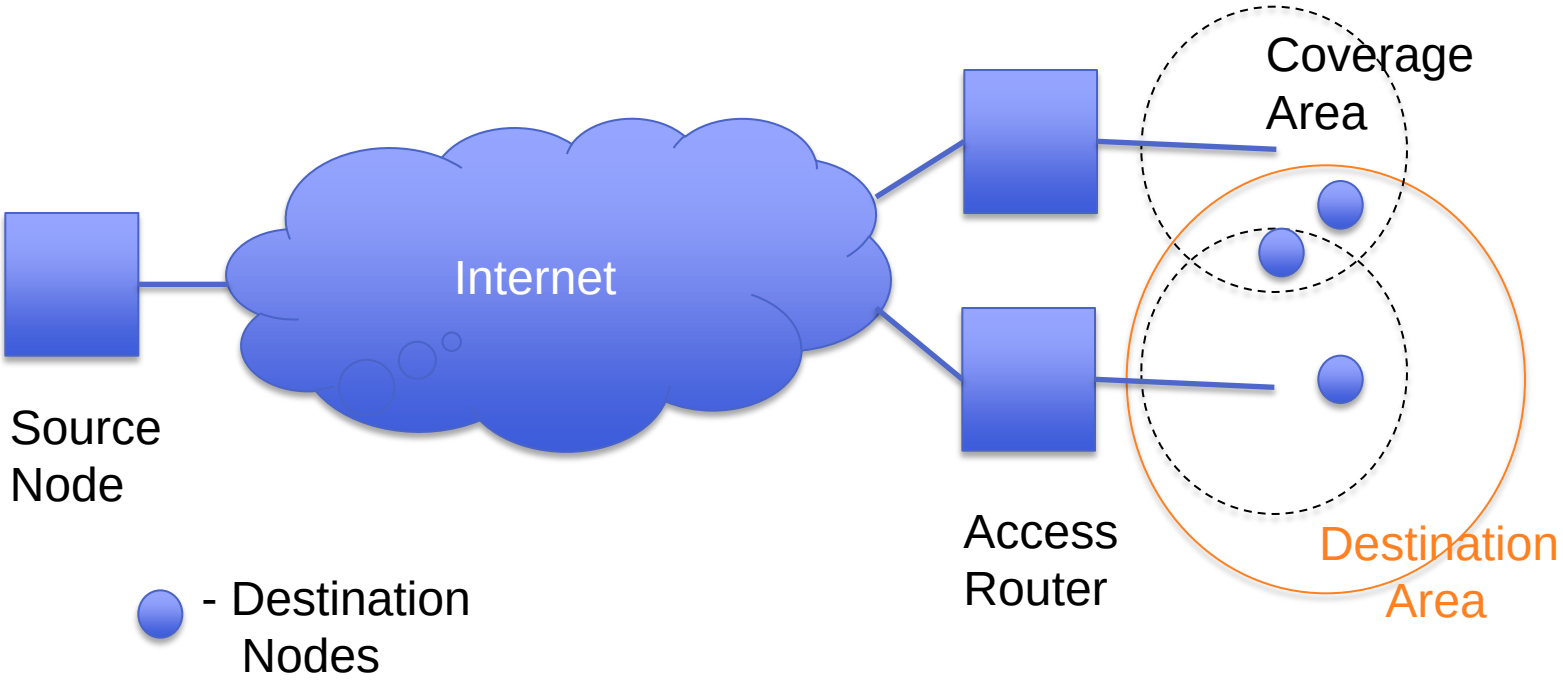
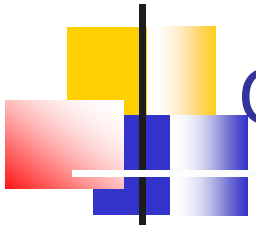


Introduction

- Internet-wide geo-networking concerns IP-layer extensions that allow source nodes anywhere in the Internet to disseminate packets to all/any node(s) with geographic location awareness within a specified destination area

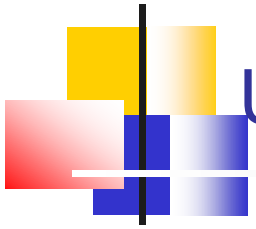
Introduction:
Internet-wide Geo-Networking scenario





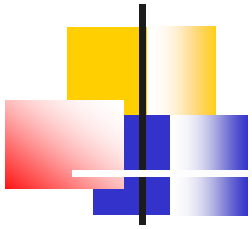
Challenges

- **Support of geographical addressing**:
  - ✓ geographical information should be available in the addressing mechanism
- **Support of Internet-wide geo-routing**:
  - ✓ data packets are forwarded over multiple hops by using geographical position of destination node(s)
- **Precision in representing geographical areas**



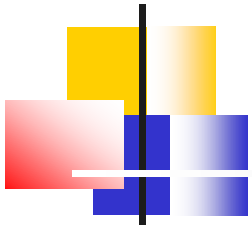
Use Cases

- **Environmental Monitoring:**
  - ✓ querying devices, e.g., sensors, actuators, located in specific geographic areas, e.g., fire hazard prevention
- **Vehicular networking**:
  - ✓ Intelligent Transportation Systems (ITS) technology required to offer a myriad of applications related to vehicles, vehicle traffic, drivers, passengers and pedestrians



Open design issues to be addressed by IETF (1)

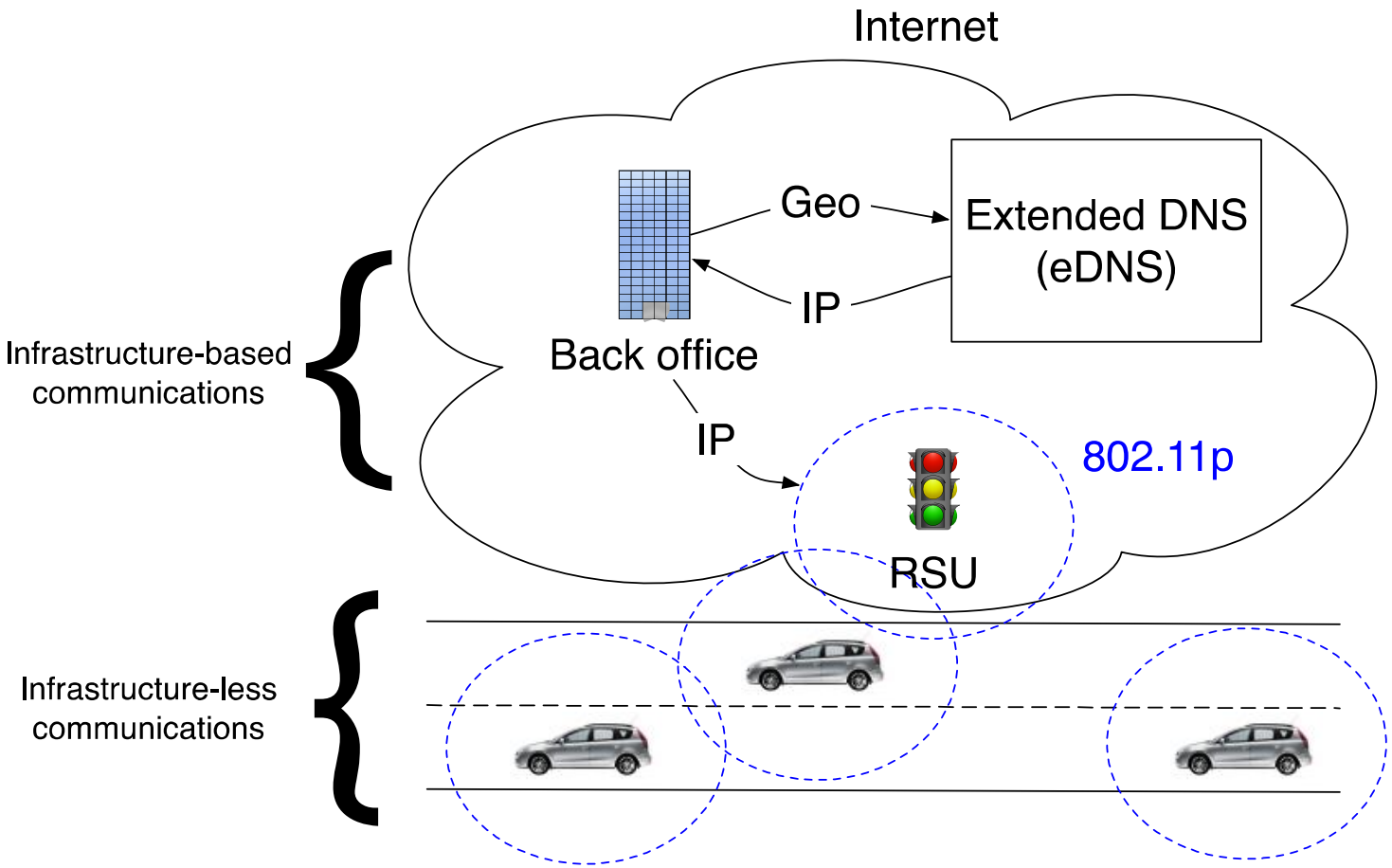
- **Geo-addressing in the wired Internet:** standard Internet routers are not aware of geo-networking functionality:
  - ✓ used addresses must be regular addresses that route to / via the correct geo-aware access router
- **Geo-routing:**
  - ✓ forwarding from source node to the correct geo-aware access router, over the standard Internet



Open design issues to be addressed by IETF (2)

- **Exchange/communicate destination area information**:
  - ✓ destination area specification needs to be exchanged/communicated between source node and correct geo-aware access router
- **Lookup and translation of destination (geographical) area to IP address**
- **Updating the location database**

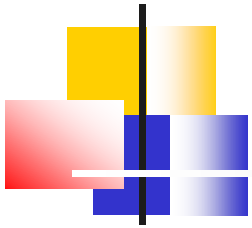
Possible solutions: Extended DNS solution (1)



Possible solutions: Extended DNS solution (2)

Approach

- Extending DNS to support ITS geo(broad)casting services
- Solves "*Geo-addressing in the wired Internet*" and "*Lookup and translation of destination (geographical) area to IP address*" by extending DNS system to resolve a geographical area to relevant IP addresses:
  - ✓ source nodes willing to send geo-networking packets can then resolve destination area of (a flow of) packets to a number of IP addresses, and send packets to these destination addresses

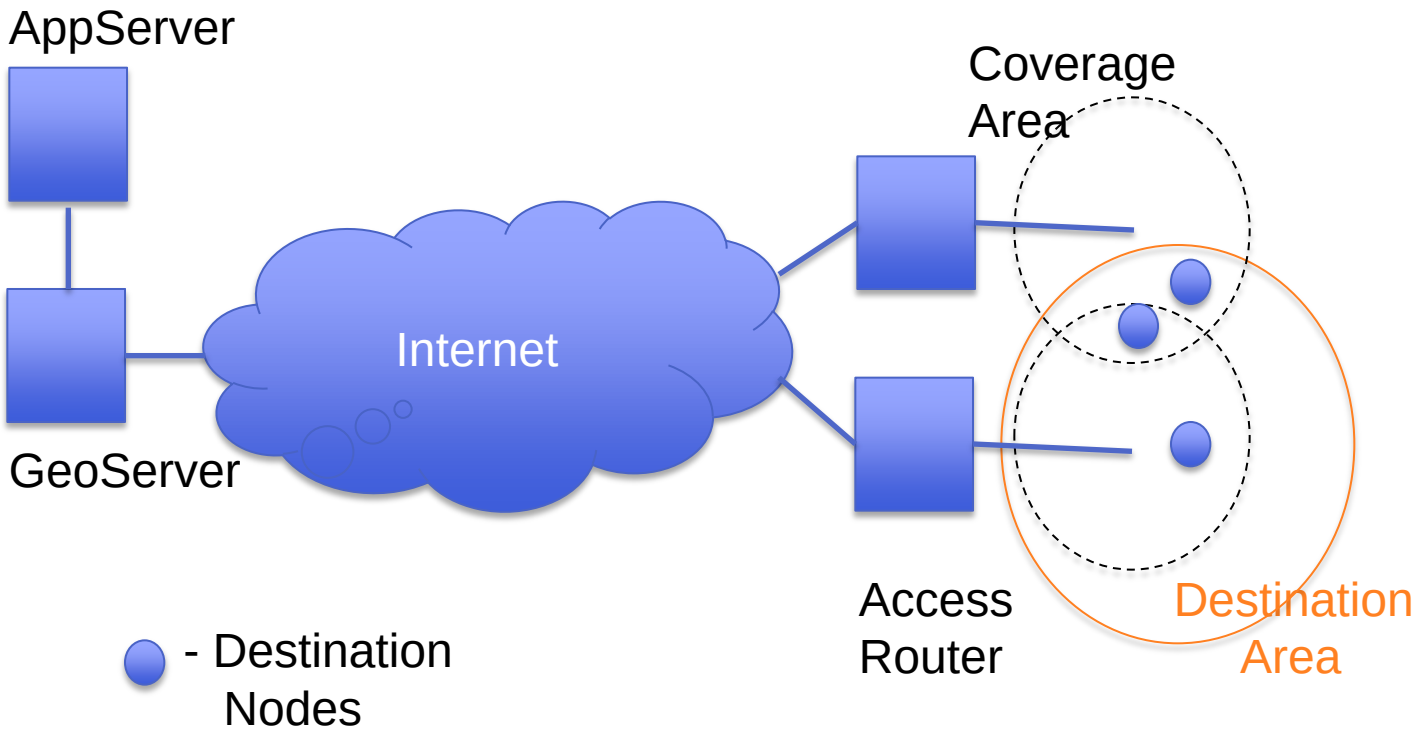


Possible solutions: Extended DNS solution (3)

What remains to be done?

- "*Geo-routing*"
- "*Exchange/communicate destination area information*"
- "*Updating the location database*"
- Satisfy set of requirements

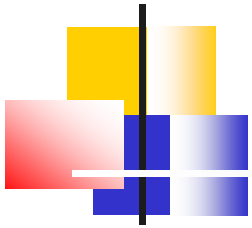
Possible solutions: GeoServer (1)



Possible solutions: GeoServer (2)

Approach

- Solves "*Geo-routing*", "*Exchange/communicate destination area information*" and "*Updating the location database*" by using a message reflector (GeoServer) to facilitate communication targeted to specific areas:
  - ✓ location updates
  - ✓ event reporting
  - ✓ geographical messaging



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