# **ENTERPRISE NETWORK INFRASTRUCTURE**

**Summary:**

A network simulation project using a Cisco packet-tracer that showcases a network design for a small and stable organization with five locations by adapting OSPF, DHCP, STP, LACP, HSRP, ACLs, VLANs, and BPDU guards.

*Note*: Only HQ locations have Finance, HR, and Tech departments, whereas other locations have just HR and Tech.

**Protocols Implemented**

1. **IP addressing scheme:**

* Developed an IP addressing scheme by efficiently performing subnetting to support up to 45+ hosts within the 10.0.0.0/16 network.
* All the assignments of IP addresses to the hosts are handled by the DHCP server by including options like subnet range, max-lease-time, address pool, and domain name. DHCP servers are in the tech department for each location.

1. **VLAN:**

* All the hosts in a department within a location can communicate with each other because of the micro-segmentation of collision domains on the switch by implementing VLANs.
* There is a total of 2-3 VLAN domains implemented across every switch in the entire network.

1. **DNS:**

* DNS servers are placed across every tech department to resolve hostname resolution queries of every router connected to the location.
* For example, one of the gateway routers connected to the Boston department will be assigned a name called BOR1, so that all the hosts in Boston should be able to ping that router just by the hostname and not just through the IP address.

1. **OSPF:**

* OSPF has been implemented to facilitate inter-location network connectivity.
* HQ locations have backup gateways to prevent single-point failures. HSRP has been implemented on these backup gateways to provide redundancy within a local subnet.
* The core network has been assigned with area 0 and all other locations are connected to this area.

1. **LACP:**

* Ether channels with LACP have been implemented in a few locations for link redundancy and improved bandwidth.
* Rapid STP has also been implemented to prevent switching loops and broadcast flooding.

**Network Topology:A computer network diagram with many blue objects

Description automatically generated with medium confidence**