

# Distributed Operating System Principles – Fall' 20

## Project 3 – Pastry

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### Project Description:

The aim of the problem is implementing the Pastry protocol algorithms for object location and routing in peer to peer overlay networks. The algorithm is built and implemented using unique identifier i.e., node id for each node and a key as a message.

- The Pastry starts by initiating the main process of a single master actor that adds the nodes into the network system and creates routing tables, leaf sets and neighborhood sets for each node joined in the system based on proximity metric. Then each node sends up to 'n' requests with a key as a message intending to forward the message to the respective node id and converges when an actor/node with key found by notifying master node.

### Implementation:

#### Project3.fsx:

Initially the program takes two command line arguments *NumNodes* (number of actors), and *NumReq* (number of requests for each node).

The program contains two actor methods, one for master, and other for pastry node. The master actor method controls pastry actors and terminates the actor system when actors had transmitted the 'n' requests in the network. The pastry actor propagates the messages to the neighboring actors based on leaf sets, routing tables, and/or neighborhood sets.

Along with these, there are few helper methods to add nodes to routing table, shl (for prefix length), broadcast routing table status and generate random nodes.

### Observations:

Largest number of actors managed to solve for Pastry is 15000 nodes and 10 requests with average number of hops as 4.824558.

### Commands to Run:

#### *GOSSIP:*

- *dotnet fsi --langversion:preview project3.fsx <numNodes> <NumReq>*
- *Ex: dotnet fsi --langversion:preview project3.fsx 100 10*

## Results:

