O-ICN Simulator (OICNSIM)

OICNSIM, an ns3 based simulator, simulates the O-ICN (Overlay Information Centric Networking) Architecture [1, 2]. Some of its main components are described below:

OicnZipfClient

1. A separate Application for sending ICN type request.
2. It generates request for the contents following Zipf-Mandelbrot Distribution.
3. It sends name resolution request to ICN Manager. ICN Manager does the name resolution and directs source (ICN router or OICN server) to send the requested content to the OicnZipfClient.

OicnClient

1. A separate Application for sending ICN type request.
2. It sends name resolution request to ICN Manager. ICN Manager does the name resolution and directs source (ICN router or OICN server) to send the requested content to the OicnClient.

ICN Manager(ICNM):

1. A software component that in real deployments can work standalone or may coincide with DNS server or SDN controller.
2. This uses a separate port (36) to listen to name resolution requests from the client (OicnZipfClient/OicnClient).
3. ICN Manager does the name resolution and directs source (ICN router or OICN server) to send the requested content to the corresponding client (OicnZipfClient/OicnClient).
4. ICN Manager first searches the name in *cachedRouterTable*, if name is not present in *cachedRouterTable* then it searches content in *nameServerTable* (Container to store mapping of name and corresponding IP address of the server.)

ICN Routers:

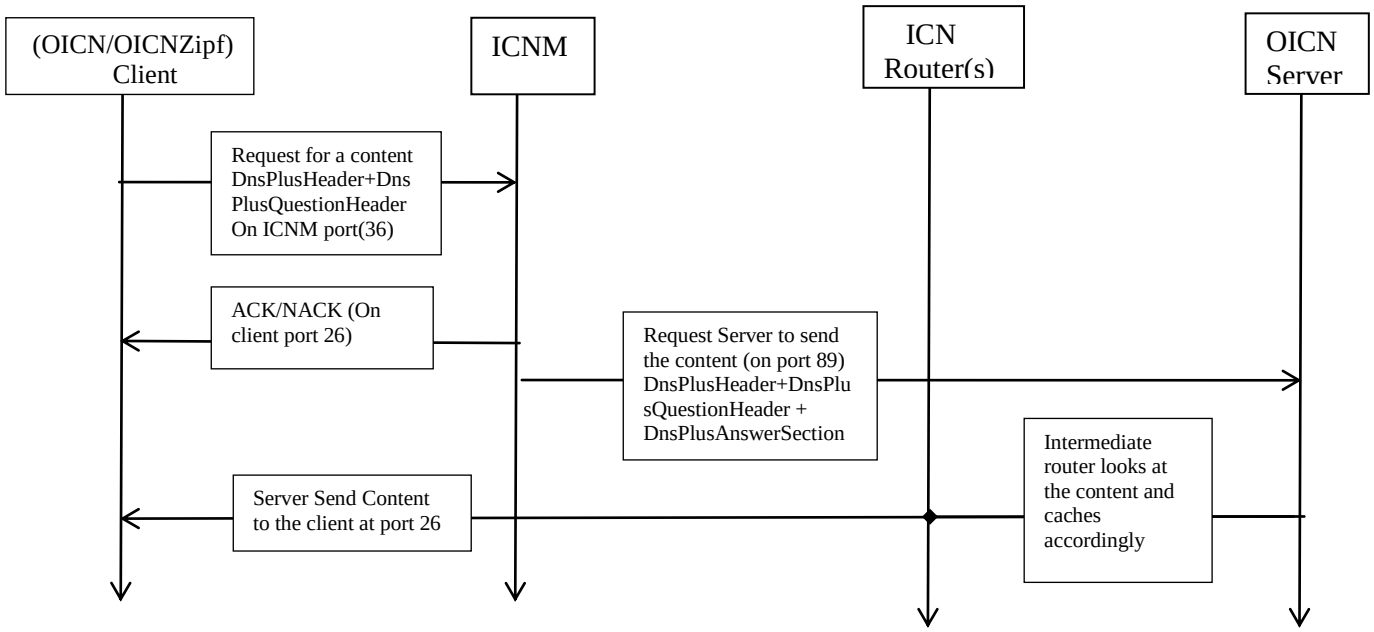
1. A normal router patched with ICN functionality.
2. It caches the content passing through it.
3. It updates any change in its cache store to the ICN Manager.
4. ICN Router listens to instructions from ICN Manager at port 89.
5. It sends cached content corresponding to the name requested to the client (OicnZipfClient/OicnClient) and also sends corresponding acknowledgement to ICN Manager.

OICN Server

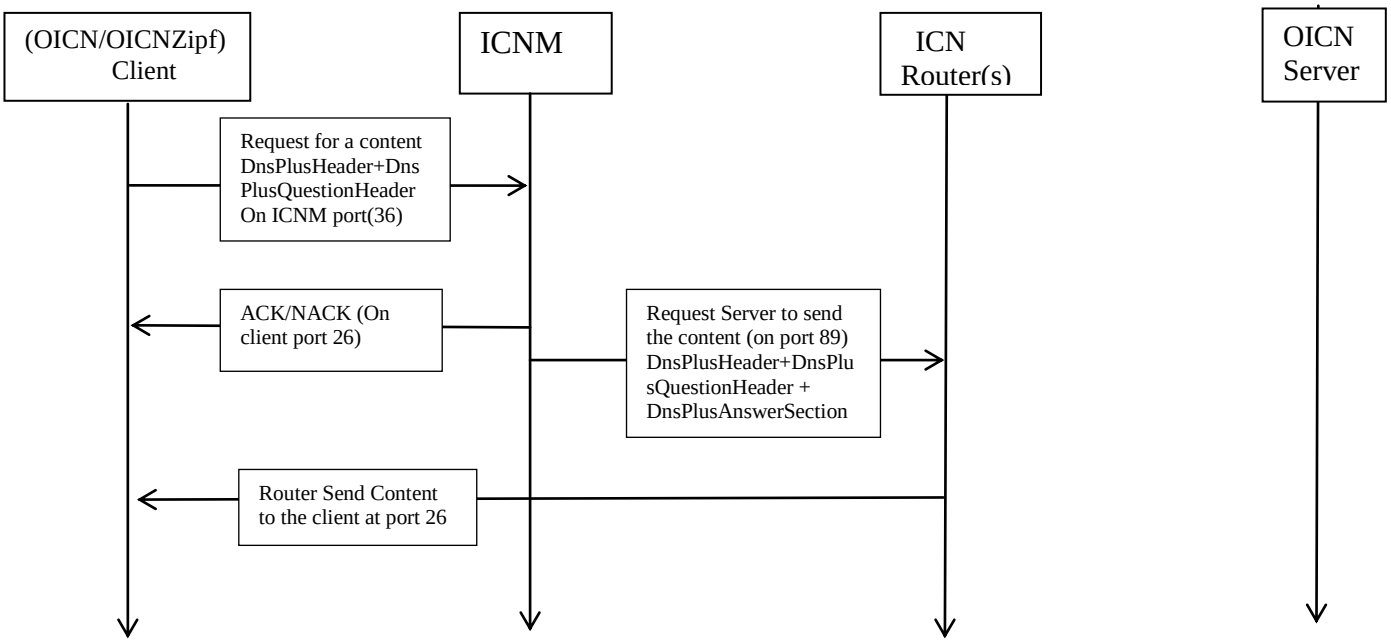
1. It hosts the contents which are identified by the unique names.
2. It listens to the content request from the ICN Manager at port 89.
3. It sends cached content corresponding to the name requested to the client (OicnZipfClient/OicnClient) and also sends corresponding acknowledgement to ICN Manager.

High Level Timing diagram for ICN Request Flow:

Case I: In this diagram we have shown the case, when client is asking the content which is not cached in the router. So the content request is redirect to server.



Case II: In this diagram we have shown when client is asking the content which has been already cached in the router. So the content request is redirect to router.



Publications:

[1] S. Shailendra, B. Panigrahi, H. K. Rath, and A. Simha, "A Novel Overlay Architecture for Information Centric Networking," in Twenty First IEEE National Conference on Communications (NCC), pp. 1–6, 2015.

[2] "Providing Requested Content in an Overlay Information Centric Networking (O-ICN) Architecture", US Patent (Patent Filing number# 14/693949)

[3] Bighnaraj Panigrahi, Samar Shailendra, Hemant Kumar Rath, Anantha Simha, "Universal Caching Model and Markov-based Cache Analysis for Information Centric Networks", Journal of Photonic Network Communications, vol 30, issue 3, pp: 428-438, December 2015.

[4] Samar Shailendra, Senthilmurugan Sengottuvelan, Hemant Kumar Rath, Bighnaraj Panigrahi, Anantha Simha, "*Performance Evaluation of Caching Policies in NDN - an ICN Architecture*", IEEE TENCON, Nov. 2016.

[5] Samar Shailendra, Bighnaraj Panigrahi, Senthilmurugan Sengottuvelan, Hemant Kumar Rath, Anantha Simha, "*Distributed Optimal Caching for Information Centric Networking (ICN),*" 27th IEEE Annual International Symposium on Personal, Indoor and Mobile Radio Communications (PIMRC), Sep 2016.

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Please don't forget to cite us!

You can site us as:

Suvrat Agrawal, Samar Shailendra, Anirudh Morabagal, Bighnaraj Panigrahi, Hemant Kumar Rath, Anantha Simha, "Overlay ICN Simulator (OICNSIM)," https://github.com/TCS-Research/OICNSIM.