

# ICN 기반 테스트베드 아키텍처의 라우팅 정보 업데이트 알고리즘

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## An Algorithm for Updating the Routing Information of ICN-based Testbed Architecture

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### Abstract

Content-Centric Networking (CCN), a popular choice among the types of Information-Centric Networking (ICN), seeks to retrieve the content requested by the users quickly using the name of the content from the neighboring content servers when it is not readily available. The routing information for the neighboring servers is kept in the Forwarding Information Base (FIB) that needs to be updated whenever there is any change in the network topology. We developed an ICN-based testbed architecture that can deliver the requested contents, including the eHealth information, in a fast manner. In this paper, we propose a new algorithm for updating the FIB of the content servers that enhances the original mechanism for updating the FIB used by the basic CCN so that faster delivery of the requested information is possible.

### I. Introduction

Many new content servers that are being connected with the Internet are becoming available from time to time. These servers need to communicate with each other so that they can provide every available content that the users request, even if it is not available at the connected server. The Content-Centric Networking (CCN) [1] focuses on the name of the content to locate and deliver the requested content instead of the location of the host that has the content. The CCN, a paradigm based on Information-Centric Networking (ICN) concepts, supports in-network caching and basic mobility support as well. We developed a testbed based on this paradigm that can provide various contents and healthcare data, including information regarding available hospitals and doctors, previous treatment histories of the patients, AR/VR videos for real-time remote surgeries, and other digitalized documents. In order to make the delivery process of the time-critical eHealth data faster using the CCN paradigm, the original algorithm used by the basic CCN for updating the Forwarding Information Base (FIB) can be enhanced. In this paper, we propose a new algorithm for updating the FIB, where the routing information of the neighboring servers is stored, that is used within the developed testbed architecture and allows to deliver the requested contents even faster.

### II. A New Algorithm for Routing Information Update

As the testbed architecture uses the CCN paradigm completely, all the content servers are recognized by their unique names. Therefore, the proposed algorithm maps the names of these content servers with their IP addresses at first so that other machines not using the CCN paradigm can identify and communicate with these machines. The FIB includes the face number where a request should be forwarded when the desired content is not available. Through that face, the appropriate content server can be reached. This process is done similarly to the basic CCN algorithm.

Additionally, we added a new process to keep track and update the list of available contents among the neighboring content servers. This process runs in the background and periodically updates the list of the available contents. Besides, when a content server becomes unavailable, this new algorithm creates a valid route among the other content servers excluding the server so that content request and retrieval processes can continue smoothly.

Below is the proposed algorithm used within the testbed architecture.

ALGORITHM: Algorithm for Updating the FIB	
<b>Input:</b> Server names, Server IP addresses	
1.	<b>MAP</b> <i>Server_Name</i> $\leftarrow$ <i>IP_Address</i>
2.	<b>CREATE</b> FIB route with new servers
3.	<b>USE</b> basic CCN mechanism
4.	<b>ADD</b> new content info from that server
5.	<b>DELETE</b> FIB entry to unavailable servers
6.	<b>REMOVE</b> unavailable contents list
7.	<b>ADD</b> new connections among available servers, if necessary

Figure 1 shows the procedure of the proposed algorithm.

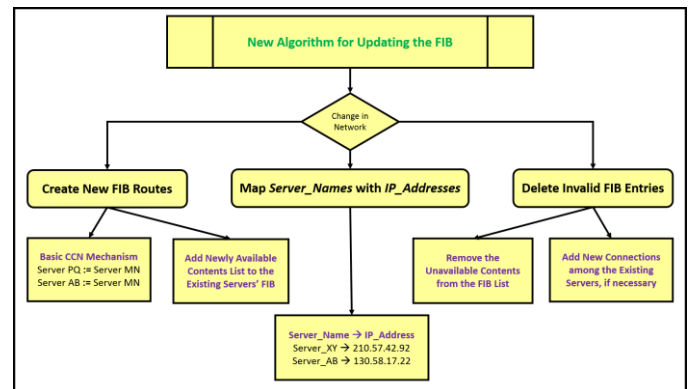


Figure 1: The Procedure of the Proposed Algorithm

### III. Concluding Remarks

We proposed a new algorithm for updating the routing information of an ICN-based testbed architecture, enhancing it from the original algorithm used by the basic CCN paradigm for faster delivery of contents, e.g., eHealth information.

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### References

- [1] V. Jacobson, D. K. Smetters, J. D. Thorton, M. F. Plass, N. H. Briggs, and R. L. Braynard, "Networking Named Content," ACM CoNEXT, Dec 2009.