

CS 6480: Paper reading summary

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1 Title of paper: A Brief Introduction to Named Data Networking

Paper discussed in this summary is “A Brief Introduction to Named Data Networking” [1].

1.1 First pass information

1. *Category:*

This paper is a description of a research prototype. The prototype being discussed is Named Data Networking (NDN).

2. *Context:*

The technical area that relates to this paper is network architecture. In fact some aspects of the DARPA net [2], are recited within this paper. Ideally NDN would fix some of the problems associated with IP.

3. *Assumptions:*

A small assumption is that the network needs to evolve along side the applications that are being developed so that the network can meet their demands. I believe that this is a valid assumption because we need to be able to support new technologies, however, we shouldn't update the network for specific use cases in technologies.

4. *Contributions:*

The authors contribute by providing a paper that offers the readers an overall picture of NDN's basic principles, concepts, operations, and properties.

5. *Clarity:*

From what I have read, this paper appears to be well written.

1.2 Second pass information

• *Summary:*

In this paper we learned a bit of the overall picture of Named Data Networking (NDN). NDN is designed to network the world of computing devices, ranging from IoT sensors to cloud servers, by naming bits rather than location. We can say that NDN is similar to HTTP's semantics of request and response. For NDN we use interest packets which contains the name of the requested data, the NDA network then responds with data packets neither of which contains an address nor information about the requestor. In NDN, consumers fetch data instead of senders pushing packets to destinations. Furthermore, NDN uses a stateful forwarding plane. Section four, touches on the idea of how NDN's forwarding engine works. Next in section 5 we learn about NDN's communication security. We then learn of NDN's need for dataset synchronization

and how Sync is used to achieve this. Lastly, in section 7 we touch on the idea of what makes NDA great for the battlefield, and how it shares various similarities and improvements from the TCP/IP architecture.

1.3 Third pass information

- *Strengths:*

I believe this paper does a great job of covering the main points of NDN, as well as providing multiple further resources if we choose to dive in a little deeper into the concepts of NDN. I also enjoyed this paper's figures because they enhanced the written text. Lastly, the abstract does a great job of really putting the papers work into one solid paragraph.

- *Weaknesses:*

I feel like this paper contained more weaknesses than strengths. It's not to say that this paper was bad I just simply think that It could have been improved. The main issues that I found relates to the format and structure of the paper. There were a lot of places where I think moving a section before another section would have been better. I also don't like how they relay on preexisting technologies to explain NDN concepts. And lastly, I wish they would have provided more examples and use cases to give me more reasons why NDN is needed/better.

- *Questions:*

I actually have a ton of questions regarding security in NDN. I don't quite understand why NDN would be more secure than IP. I especially don't understand when they say that NDN has natively built in security.

- *Interesting citations:*

In the questions section above I listed my confusion with NDN security. It was also mentioned in the paper that NDN proves to be most resilient against DoS attacks. They didn't mention why so I'm hoping that this paper on DoS

and NDN [3] will help answer some of these questions.

- *Possible improvements:*

I believe that if they added more examples and use cases it would have made their paper stronger. I also strongly believe that If they used more subsections and better name schemes their paper would be easier to read and follow.

- *Future work:*

I would like to do a measurement study on round trip time for NDN's datagram delivery. I would also like to look more into NDN's self-learning function. Not much was said about the self-learning function that I wonder if it uses AI or machine learning to work. Another Idea could be a case study on how ineffective DoS attacks are against NDN compared to IP.

References

- [1] AFANASYEV, A., BURKE, J., REFAEI, T., WANG, L., ZHANG, B., AND L., Z. A brief introduction to named data networking. *MILCOM 2018 - 2018 IEEE Military Communications Conference* (Oct. 2018).
- [2] CLARK, D. The design philosophy of the darpa internet protocols. *ACM SIGCOM Computer Communication Review* (Aug. 1988).
- [3] GASTI, P., TSUDIK, G., UZUN, E., AND ZHANG, L. Dos and ddos in named data networking. *2013 22nd International Conference on Computer Communication and Networks* (Oct. 2013).