

# **End-To-End Arguments In System Design : Paper Review**

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The authors primarily discuss the design principles that govern end-to-end internet architecture. The thought of developing this architecture is directly implemented from the paper to reality which was a massive leap in the growth of the internet. This paper provides a base for the evolution of the internet which explains the design principles in distributed computer systems. This paper mainly tells about the reliability of the end-to-end network. The authors have clearly described how the design principles of the end-to-end system improve the pre-existing algorithms and improve the overall security during communication between host and receiver.

The key takeaway from this paper is how the end-to-end is implemented. The author has explained it in a very delightful way, by considering the example of something called the “careful file transfer” where the file uses the data communication protocol and splits the data into different packets and how it moves from Computer A to Computer B. The Authors ask pivotal questions to themselves, What if the incorrect data is received There is some major hardware failure or There is a loss of packets? Authors artistically answer this question by introducing an alternate approach called ‘end-to-end check and retry’. They have introduced a term called ‘checksum’ which will help in reducing the error. The technique of comparing checksums is an essential aspect of reliability. The authors also explained the practical aspect of this by quoting an incident that occurred at MIT.

By reading the paper we understand that the end-to-end technique reaches both higher-level subsystems and lower-level sub-systems. Authors remark that the delivery is guaranteed in this kind of scenario because an acknowledgment is always sent from the receiver that ‘the packet is received or not’. They also explore the strategy to obtain immediate acknowledgment which makes the system more efficient. The next aspect is the secure transmission of data where packets are encrypted. The authors also cover the authenticity check. The question which arises in the reader's mind is ‘What if duplicate messages are being sent ?’ Authors also implore this and suggest that end-to-end also supports duplicate message suppression.

This classic paper serves as the base for the modern internet as we know it today. The authors efficiently explore the key aspects of end-to-end architecture. It tells us about the various design strategies and real-life examples of this architecture. It also explores the security aspect of this argument. The performance aspect of this architecture seems to be off since not much has been mentioned on the performance and cost-effectiveness of this argument. Authors have also taken the major operating system concept i.e First in First Out. The SWALLOW system is a little hard to get; the authors should have explained it with a real-time example to describe it more clearly.

Overall the authors have worked hard and described the end-to-end concept and the paper is a must-read to know more about the history and evolution of the INTERNET.