DIPARTIMENTO
DI INGEGNERIA
DELL'INFORMAZIONE

800 ANNI 1222·2022

UNIVERSITÀ
DEGLI STUDI
DI PADOVA

SIGNET
signet.dei.unipd.it

How to write technical report

ICT for Industrial Applications
(ICT4IA)

Andrea Zanella (zanella@dei.unipd.it)
Office number: (049 827)7770

SIGNALS AND NETWORKING RESEARCH GROUP

Identify the problems with this TR

- **Title: Stuff About Networks**
- So, I was looking at how data gets around in networks, and it's like, super complicated. There's all these routers and switches, and somehow, data finds its way from one computer to another. It's all based on this thing called the Internet Protocol, which is pretty cool.
- Anyway, I did this experiment where I sent some data from my laptop to my friend's computer. I used some commands I found online to see the route the data took. It went through like, a bunch of routers. I'm not sure why it took the route it did, but it eventually got there, so that's good.
- I also read this paper by someone named Smith or something, and they said that networks are getting faster because of new technology. But they didn't talk much about the details, so I guess you just have to take their word for it.
- In conclusion, networks are really important for sending data, and they work because of routers and stuff. There's a lot of technology involved, and it's getting better all the time.

Common mistakes

1. **formal Language and Tone:** The use of casual language ("stuff," "like," "super complicated") is not appropriate for a technical report. Technical writing should be formal and precise.
2. **Lack of Structure and Clarity:** The report jumps from one idea to another without clear organization. Each section should have a clear purpose and flow logically from one to the next.
3. **Insufficient Technical Detail:** The report mentions using commands to track data routes but doesn't specify which commands or how they work. Technical reports should include detailed explanations of methodologies and technologies discussed.
4. **Vague References:** Referring to sources vaguely ("this paper by someone named Smith or something") is not acceptable. Citations should be precise and follow a standard format, allowing readers to locate the referenced work.
5. **Lack of Objectivity and Unsupported Claims:** The report includes personal opinions and assumptions without evidence. Technical writing should be objective, and all claims should be supported by data or references.
6. **Poor Conclusion:** The conclusion is too general and doesn't summarize key findings or implications of the work. A good conclusion should recap the report's main points and suggest future work or implications.

How to improve

- **Use Formal Language:** Adopt a professional tone and precise vocabulary suitable for a technical audience.
- **Structure the Report Clearly:** Organize the content logically, using headings and subheadings to guide the reader through the report.
- **Provide Detailed Technical Information:** Explain methodologies, technologies, and processes in detail, ensuring the reader understands the work conducted.
- **Cite Sources Correctly:** Use a standard citation format (e.g., IEEE, APA) to reference all sources accurately.
- **Maintain Objectivity:** Present information and analysis based on evidence, avoiding personal opinions unless explicitly stated as such.
- **Craft a Strong Conclusion:** Summarize the report's key findings, discuss their implications, and suggest areas for future research.

Well-written technical report

- **Title: Analysis of Network Performance Enhancements Through Protocol Optimization**
- Abstract
- This report presents a comprehensive analysis of network performance improvements achieved through the optimization of Internet Protocol (IP) settings. By systematically adjusting IP parameters, we investigate the impact on data throughput and latency, offering insights into the potential for network efficiency gains.
- Introduction
- With the exponential growth of digital data transmission, optimizing network performance has become crucial for maintaining the quality of service. This study focuses on the application of protocol optimization techniques, specifically within the Internet Protocol suite, to enhance data transmission efficiency.
- Methodology
- The analysis was conducted in a controlled laboratory environment, using a network setup consisting of two endpoints and three routers to simulate a real-world data transmission path. The key variables adjusted included the Maximum Transmission Unit (MTU) size, window scaling, and the use of Selective Acknowledgments (SACKs). Performance metrics, such as throughput and latency, were measured using the iperf3 network testing tool, with each test conducted five times to ensure accuracy.

Well-written technical report

- Results
- The optimization of IP settings resulted in a noticeable improvement in network performance. Specifically, adjusting the MTU to 1460 bytes, enabling window scaling, and activating SACKs led to an average throughput increase of 25% and a reduction in latency by 15%, compared to the default settings.
- Discussion
- The enhancements in network performance can be attributed to the more efficient use of bandwidth and reduced overhead in data transmission. The adjustment of the MTU size minimizes the fragmentation of packets, thereby decreasing the transmission overhead. Similarly, window scaling and SACKs contribute to better congestion control and error recovery, enhancing the overall data flow efficiency.
- Conclusion
- This study demonstrates the potential of protocol optimization in improving network performance. By fine-tuning IP settings, significant gains in data throughput and latency reduction were achieved, underscoring the importance of continuous protocol analysis and adjustment in network management. Future work should explore the impact of these optimizations in varied network conditions and across different network topologies.
- References

1. Smith, J., & Doe, A. (2023). "Optimizing IP for High-Speed Networks," *Journal of Network Technologies*, vol. 34, no. 2, pp. 145-159.
2. Lee, B. (2022). "Network Performance Analysis Tools and Techniques," *Proceedings of the International Conference on Network Management*, pp. 88-97.