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device protection and synchronization

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Report submitted for **SE2206: Information Security** under BSc. in Software Engineering Program, Institute of Information Technology (IIT), Noakhali Science and Technology University

Project Area: **Information Security .....**
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Abstract

This report is a simple template intended as a simple, consistent starting point to prepare ensure proper device protection and synchronization reports in Software Engineering Program, Institute of Information Technology (IIT), Noakhali Science and Technology University.

Ultra-reliable and low-latency communications (URLLC) is an emerging feature in 5G and beyond wireless systems, which is introduced to support stringent latency and reliability requirements of mission-critical industrial applications. In many potential applications, multiple sensors/actuators collaborate and require isochronous operation with strict and bounded jitter, e.g., 1s. To this end, network time synchronization becomes crucial for real-time and isochronous communication between a controller and the sensors/actuators. In this paper, we look at different applications in factory automation and smart grids to reveal the requirements of device-level time synchronization and the challenges in extending the high-granularity timing information to the devices.[3]

Notes: Your report should include a short summary (usually called an abstract). Discuss the role and style of abstract to be included with your supervisor or lecturer.

Some general advice: this should be concise, but clear. If it is too long, it dilutes the important features, too short and it has no information. So it's a balancing act. What are the most important things someone reading your report should know about the task and the results?

In an industry report it might often be called an "executive summary," but in this case, it's even more crucial because it is often the only part your boss or customer will actually read! They don't want to wade through hundreds of pages of technical muck to get the message (they do want the muck – it is needed to support the results – but they might not examine it in detail).

It's also the main draw card of an academic paper – it's how I will decide whether to bother reading the rest of the article.

1 Introduction

1.1 Sub Intro

The intention of this file is to provide a simple, consistent LaTeX template for Institute of Information Technology (IIT),
Noakhali Science and Technology University. Its goals are

1. to ease production of clean, appealing reports in LaTeX;
2. to allow us to provide consistent guidelines as to the desired length of the reports; and
3. to be a source of advice about writing your report.

The intention is that everyone can replace text with their own, and so start their report. In 5G and beyond wireless systems, ultra-reliable and lowlatency commu-

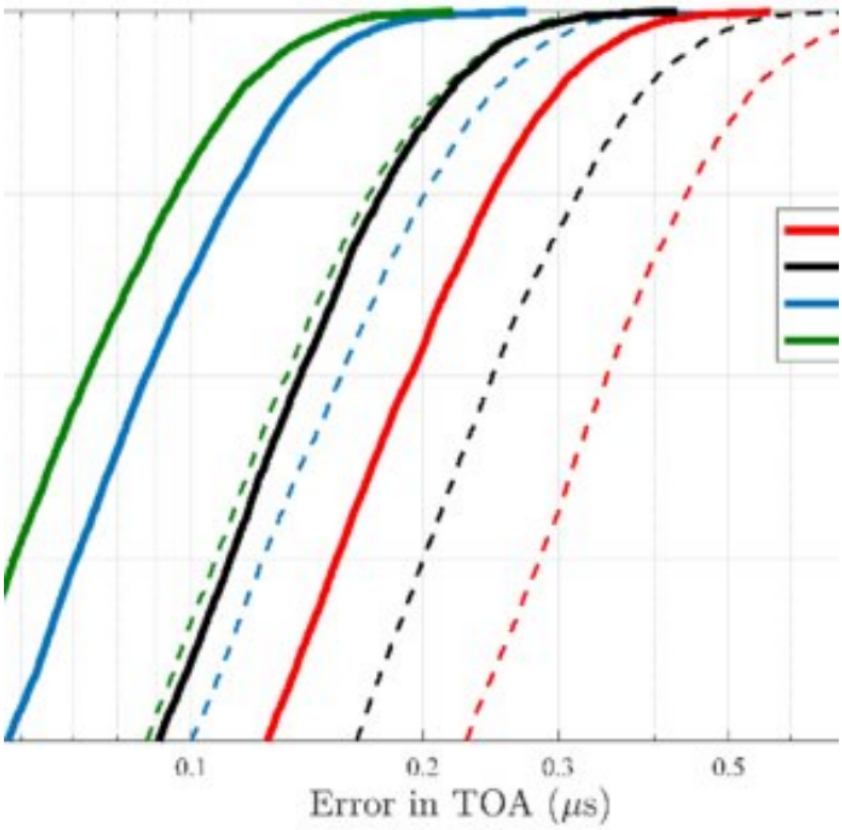
nications (URLLC) feature is focused on timesensitive applications originating for vertical industries such as industrial automation, smart grids, tactile internet, automotive and more. There can be many use cases within a single industry while each use case presents a different set of requirements and challenges. For instance in industrial automation, factory automation is one of the most challenging use case for URLLC that requires deterministic communication with bounded reliability and latency. and ultra-tight synchronization of the entities with a common time reference is need to complete manufacturing. As there are many existing industrial wired and wireless systems [1].

Notes: An introduction must be strong.
Important facets of an introduction are:

- introduced the basic ideas to be presented [2] (at a high level);

- strongly motivate the work;
- describe what you will do and present; and
- give a summary of key results.

In this article, we highlight the drivers and challenges of ultra-tight time synchronization in factory automation and smart grids. We identify the opportunities in the LTE air interface to enable OTA synchronization solutions.



2 Background

The first section, in many cases, that you present should present related background material [1]. In might include:

- literature review or related work section;
- common notation and definitions; and/or
- references for techniques to be used.

two systems are frequency synchronized when their significant instants occur at the same rate. • Phase: in phase synchronized systems, the rising edges occur at the same time, e.g., the point in time when the time slot of a frame is to be generated.

Notes: A device maintains the sense of time–a clock–by counting the pulses of an internal crystal oscillator [7]. But, there is an inherent inaccuracy in frequency (causing clock skew) and phase of the crystal oscillator. The inaccuracy is influenced by the operating conditions and aging (resulting in clock drift). As a result, the devices deviate from a reference clock after a synchronization epoch.

3 Methods

According to Kitchenham et al. [13], both research and practice in Software Engineering require evidence based approach which is the synthesis of scientific studies correlated to a question or topic of the research. In addition, it is also being agreed by [14] that, combining empirical studies on a particular topic greatly ensures the chances of reliability. Therefore, a secondary study known as Systematic Literature Review (SLR) is recommended for aggregating evidences. The aim of Systematic Literature Review (SLR) is to institute a formal process for conducting a literature review, making sure that no biasness and other eventualities such as thorough investigation and analysis are administered [15]. SLRs allow the identification, evaluation and interpretation of all available and relevant information with respect.

Basing on Kitchenham et al. [13] review protocols, research questions were defined, search strategy was outlined and resource/materials to be studied were identified and selected. These were later followed by data synthesis to conduct the findings. Fig. 1 shows the SLR review protocol phases.

Notes: This template suggests that your next section should describe methods used or developed in this report. Methods that are simple background material should go in the previous section. This section focuses on those that are novel, or in some cases just more difficult and more important for the work.

4 Results

This template has no results to report.

Notes: Remember the advice from the previous section. You need your results to be concise, but once again be concrete, quantitative, and provide enough information that the results could be reproduced and verified.

Figures and tables can be very useful. However, while a picture is worth a thousand words, this is not true by itself. Any graph of figure included in a report MUST have:

1. a detailed caption describing exactly what the figure shows (it should almost stand alone);
2. appropriate axes with labels including units; and
3. discussion in the text of the document, not just the caption (make sure you refer to exact figure numbers in the text).

Moreover, they should be easy to read with large enough text, and clearly marked data points. Tables should be treated similarly. A few such in a document are very useful, but be aware that deluging a reading with figures and tables can be counter-productive. Part of the art of technical writing is choosing good ways of informing the reader of the critical information without diluting it with volumes of irrelevancies.

5 Conclusion

In this section, we introduce the principle of PTP and give a short application summary of PTP. Then we describe the principle of physical-layer relatively synchronization in network.

It includes some advice about that report, but the brevity of this report means that this advice is simplified and generic. You should consult your lecturer for more detailed and specific advice.

Notes: All works should have a conclusion. Briefly summarise your report . Discuss the most important features of what you have achieved, and the implications of your results. The conclusion should not introduce new information or ideas, however, if you feel it is appropriate, you may speculate on directions for future work.

Acknowledgements

This research is conducted in direct supervision of the Software Evaluation and Re-Engineering Research (SERER) Lab.

Notes: It is common that you will want to acknowledge the contribution of others to your work, even though these might not have been sufficient to warrant being a co-author.

funding support, or moral support for the work.

This is a short appendix, just included as an example.

Notes: An appendix can be used to include material that is important, but not needed in the main body of the text, and which it might detract from the main point of the report.

However, for the convenience of your supervisors who may wish to examine the code, and for your own benefit (in having a self-contained document), you may wish to include the code in an appendix.

References

[1] Brad Arkin, Scott Stender, and Gary McGraw. Software penetration testing. *IEEE Security & Privacy*, 3(1):84–87, 2005.

[2] Aileen G Bacudio, Xiaohong Yuan, Bei-Tseng Bill Chu, and Monique Jones. An overview of penetration testing. *International Journal of Network Security & Its Applications*, 3(6):19, 2011.

[3] Aamir Mahmood, Muhammad Ikram Ashraf, Mikael Gidlund, and Johan Torsner. Over-the-air time synchronization for urllc: Requirements, challenges and possible enablers. In *2018 15th International Symposium on Wireless Communication Systems (ISWCS)*, pages 1–6. IEEE, 2018.

Notes: A critical component of the work is the list of references. We have discussed their use earlier – here I simply make some notes on their presentation.

This is one of the hardest parts to get just right. BibTeX can help a great deal, but you need to put a good deal of care in to make sure that

- the references are in a consistent format;
- all information is correct; and
- the information included is in the correct style for the intended audience.

Details *really* matter in this section. It's easy to lose marks in this section.

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PAGE 5

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PAGE 6

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