Supplement of "FLUID: Flexible User Interface Distribution for Ubiquitous Multi-device Interaction"

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1 APPENDIX

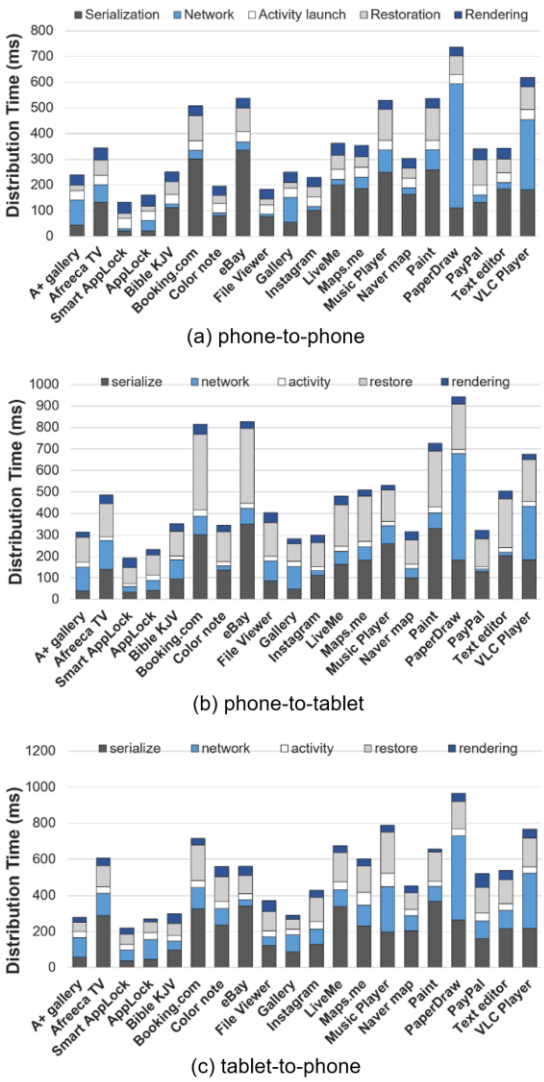

Figure 1: UI distribution time for three device setups

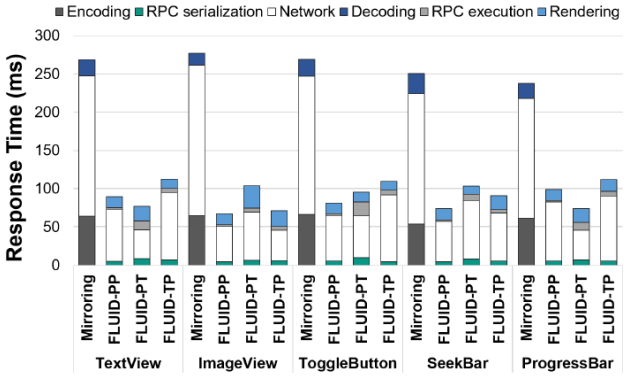

Figure 2: UI response time for three device setups

UI distribution time. Figure 1 illustrates UI distribution time measured for 20 legacy apps using different device setups: phone-to-phone, phone-to-tablet, and tablet-to-phone. The result of each setup shows a similar tendency such that serialization and restoration (de-serialization) have large overhead although its absolute values depend on hardware specs of used devices. As mentioned in our paper [1], we have utilized a serialization library called Kryo [2] in our current prototype. Its current implementation has deep and frequent recursions, which may lead to significant performance overhead when serializing / restoring UI objects. We expect that we can optimize it by avoiding deep and frequent recursions.

UI response time. Figure 2 shows the average UI response times in updating five most popular UI widgets with FLUID, compared to an open-source screen mirroring, SCRCPY [3]. *FLUID-PP, FLUID-PT, and FLUID-TP* denote UI response times for phone-to-phone, phone-to-tablet, and tablet-to-phone respectively. We observed FLUID outperforms the screen mirroring approach by 2x to 4x for three device setups.

REFERENCES

[1] Sangeun Oh, Ahyeon Kim, Sunjae Lee, Kilho Lee, Dae R. Jeong, Steven Y. Ko, and Insik Shin. 2019. FLUID: Flexible User Interface Distribution for Ubiquitous Multi-device Interaction. In Proceedings of the 25th Annual International Conference on Mobile Computing and Networking (MobiCom '19).
[2] Esoteric Software. 2019. Kryo. https://github.com/EsotericSoftware/kryo.
[3] Genymobile. 2019. Scrcpy. https://github.com/Genymobile/scrcpy.