PowerSlice: Supplying A World of New Devices

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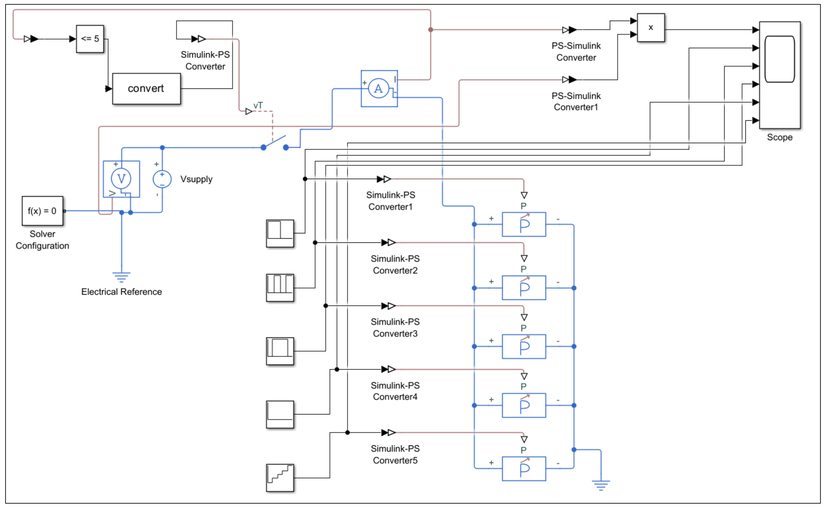
Overview

- PowerSlice is a portable, compact USB power splitter for portable electronic devices
- Takes an input from USB PD supply and divides it between connected devices

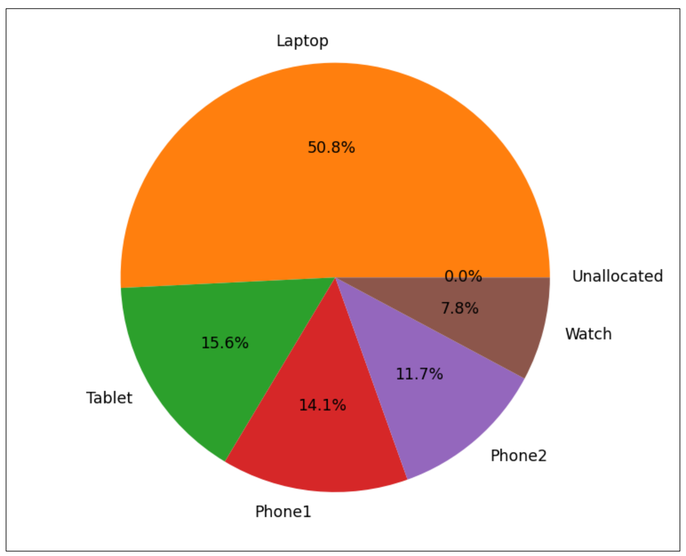
Methods

- Initial goal of building a physical prototype of the power splitter
- Physical implementation would be expensive in terms of money and time
- Pivoted to solving arbitration problem between connected devices
- How do multiple devices share a limited power source?
- Initially modelled power flow in a hypothetical system with multiple loads
- Developed a Python script to balance power between devices

Results



MATLAB Simulink Power Flow Model



Python Device Power Manager

Conclusions

- Initial management system able to balance power between theoretical devices
- More development needed to add different charging schemes and handle nonidealities of real system

Next Steps

- Add priority assignment capability, be able to funnel all power to one or more specific devices
- Handle real power variations, nonidealities of converters and losses in device
- Handle different charge rates, reallocating power as devices go through their charge cycles
- Once arbitration system is complete, can move onto physical realization of device