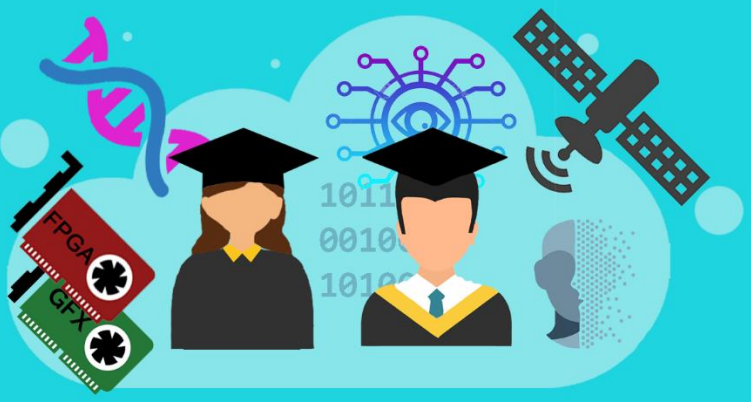
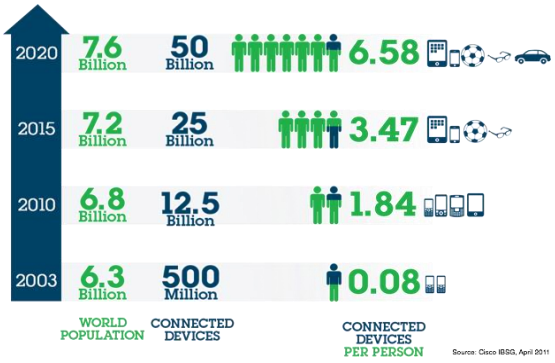
Diploma Thesis

Microproccessors and Digital Systems Laboratory

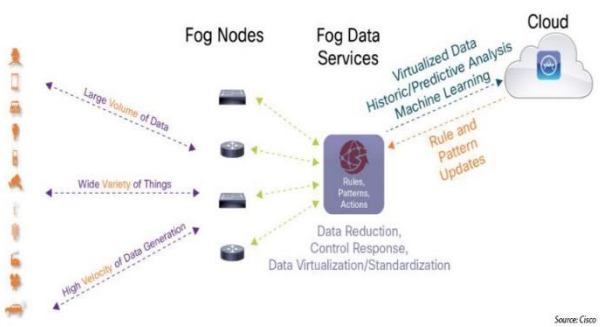


Fog Computing and Internet of Things

The Internet of Things (IoT) is becoming an increasingly growing topic of conversation both in academic and industrial community. Simply put, IoT is the concept of basically connecting any everyday device to the Internet (and/or to each other), thus allowing them to send and receive data. Looking to the future, Cisco predicts there will be approximately 50 billion devices connected to the Internet by 2020. That is a huge amount of data being generated, which need to be processed and analyzed.



The current paradigm for the processing of that huge amount of data is uploading, storing and processing using Cloud computing. However, many applications require real-time processing of data and decision making as well as data anonymity which is difficult to guarantee under the current processing architecture. For example, healthcare companies don't want to stream critical data points generated by life-saving systems. That data needs to be processed locally not only for faster turnaround but also for anonymizing personally identifiable patient data.



The demand for distributing the IoT workloads between the local data center and cloud has resulted in an architectural pattern called Fog computing (aka Edge computing).

Fog could be described as a middle layer between the IoT devices and the Cloud which allows us to process data on the edge, resulting in faster processing times and fewer resources consumed.

The research aspects of the existing and proposed IoT based architectures pose numerous research challenges in areas that include resource management, HW/SW co-design, safety, security, reliability and robustness of the system. Towards this direction, our lab will support a number of diploma theses which will aim at analyzing existing state-of-the-art IoT based architectures and proposing solutions for the identified research gaps.

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