MICHIGAN STATE UNIVERSITY

Beta Presentation

SmartSat™ Heterogenous Computing in Space

The Capstone Experience

Team Lockheed Martin Space

Nolan Baldwin
Alex Taylor
Shivang Patel
Austin Declark
Joseph Stafford

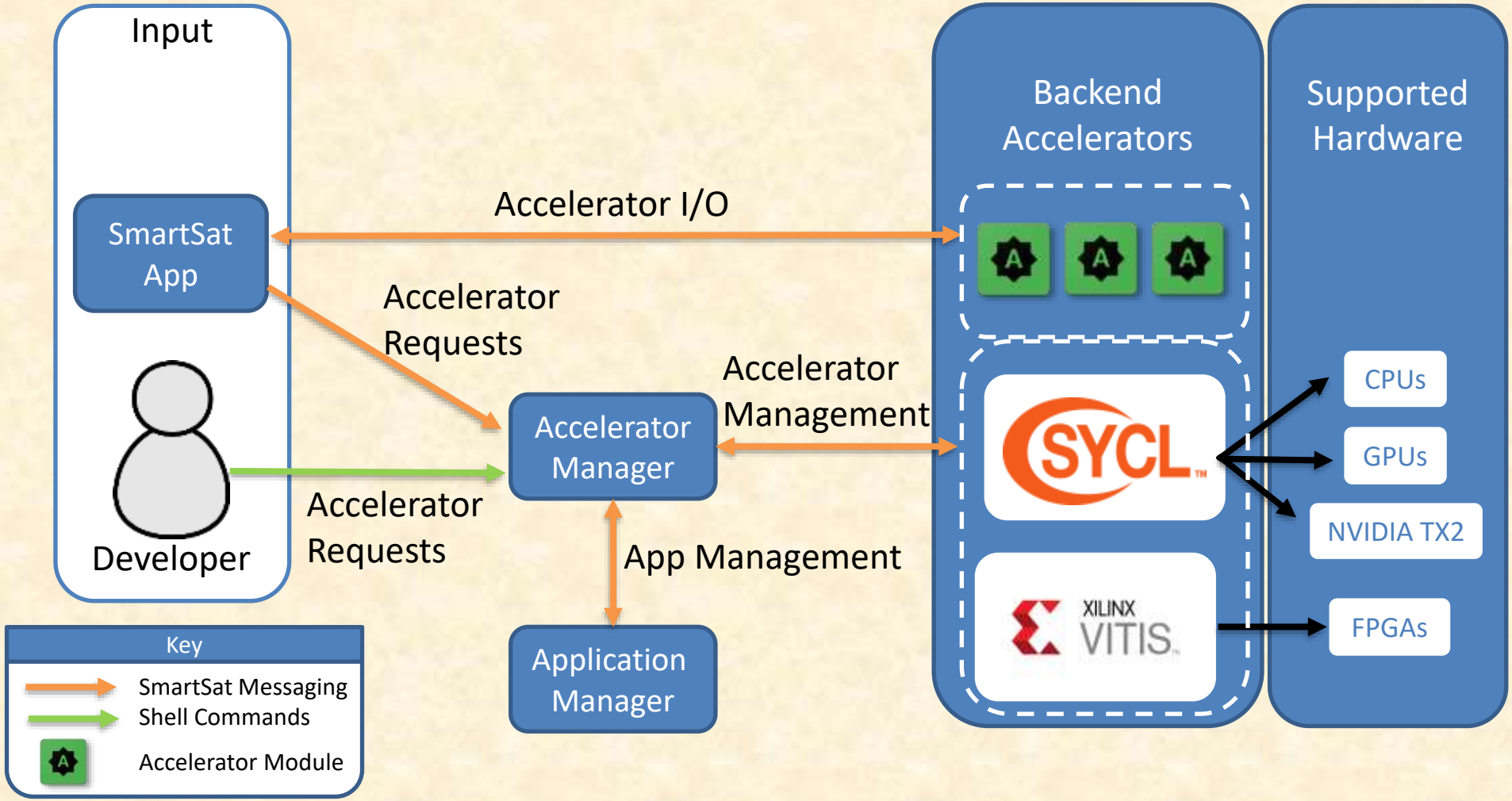
From Students…
…to Professionals

Department of Computer Science and Engineering
Michigan State University
Fall 2020

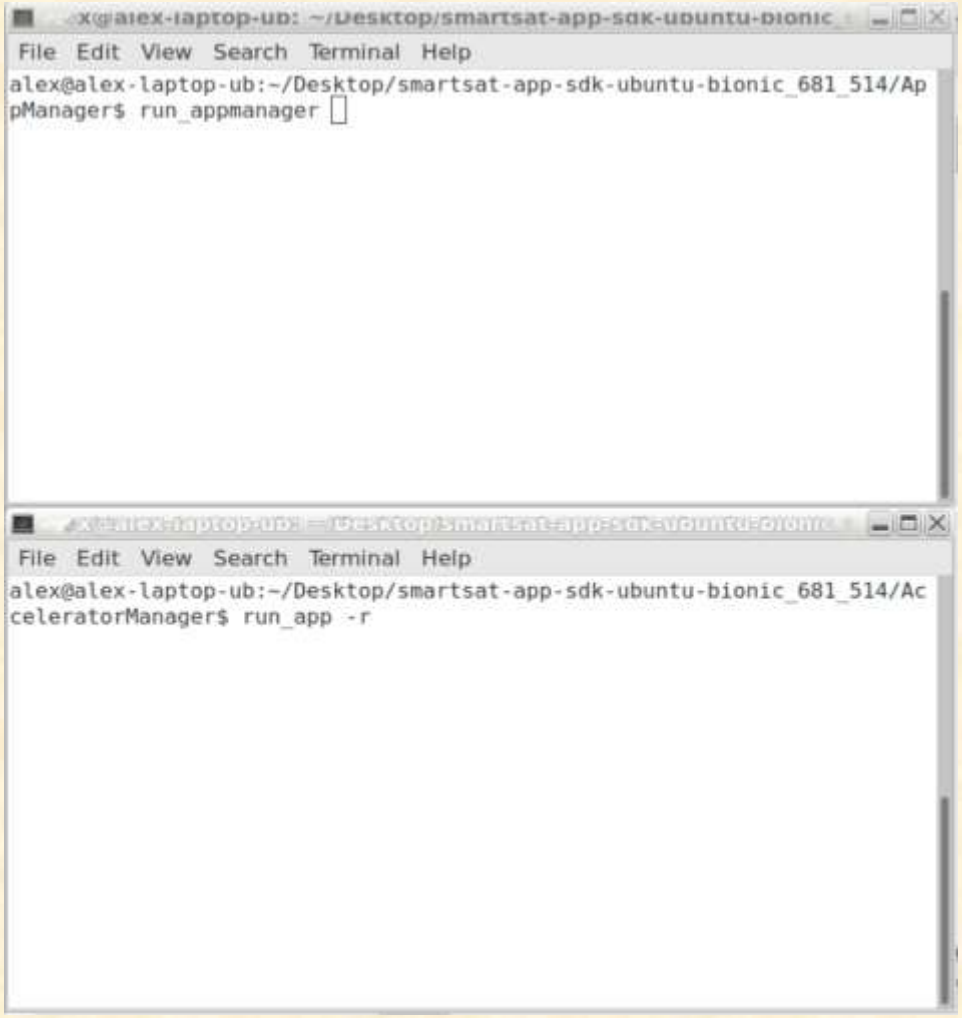
Project Overview

- Manage and load accelerator programs
- Optimize hardware usage with smart selection
- Reduce downlink time through on board data proccessing

System Architecture



Startup Backend Applications



Accelerator Load Command

```
Message to Accelerator Manager:
Command LOAD
BackendCommands:
    1. SYCL
        Command: LOAD
        Accelerator Name: CPUSycl
        Accelerator Name: GPUSycl

Waiting to send LOAD command
```

Accelerator Unload Command

```
Message to Accelerator Manager:
Command UNLOAD
BackendCommands:
    1. SYCL
        Command: UNLOAD
        Accelerator Name: GPUSycl

Waiting to send UNLOAD command
```

Accelerator Output Greyscale Image

What's left to do?

- Deploy SYCL Smart-Sat platform to TX2
- Complete Vitis Backend integration
- Test deployment on complete system; a machine with access to TX2 and FPGA

Questions?