

**MICHIGAN STATE**  
**UNIVERSITY**

# Alpha Presentation

## SmartSat™ Heterogenous Computing in Space

The Capstone Experience

Team Lockheed Martin Space

Nolan Baldwin

Austin Declark

Alex Taylor

Shivang Patel

Joseph Stafford



*From Students...*  
*...to Professionals*

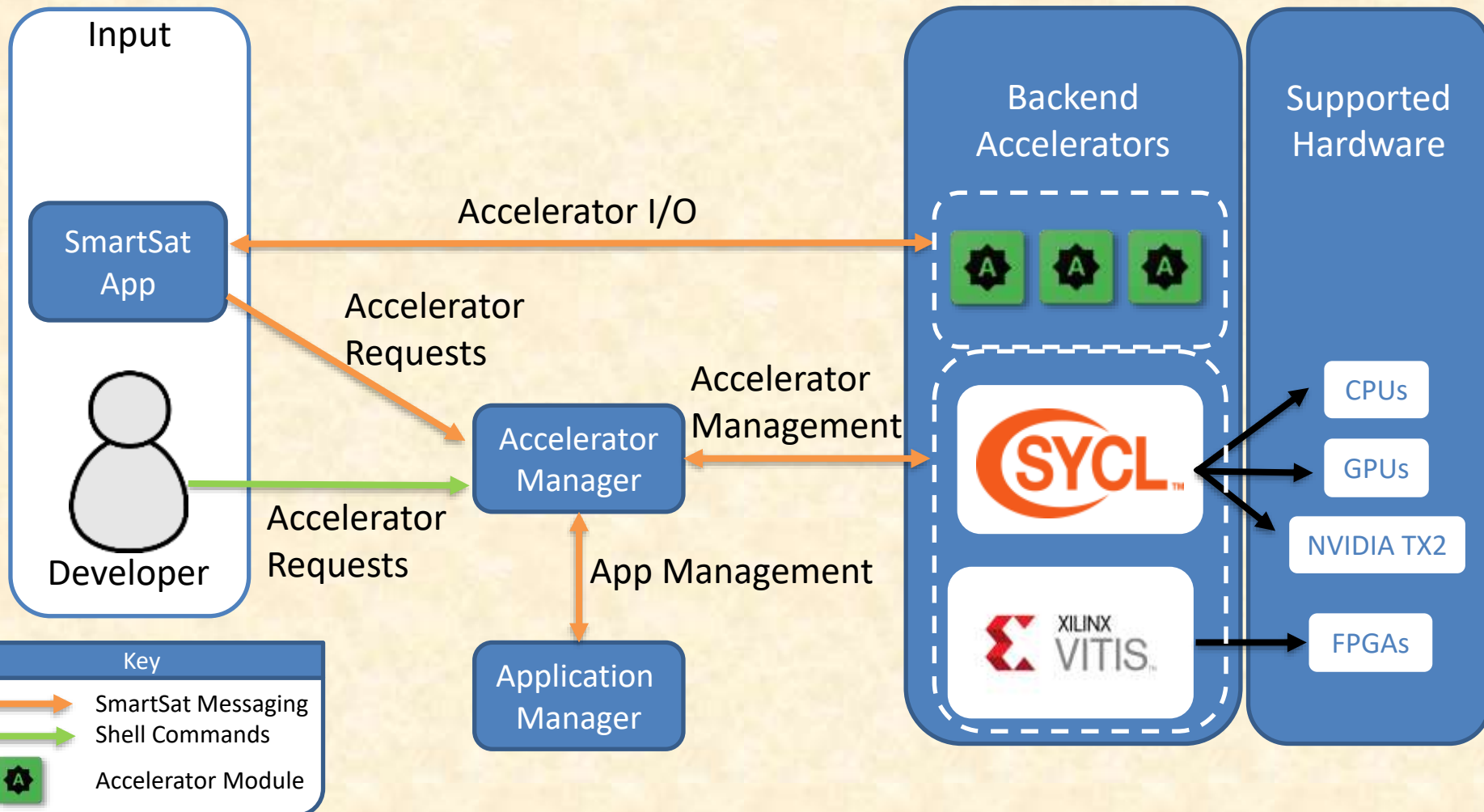
Department of Computer Science and Engineering  
Michigan State University  
Fall 2020

# Project Overview

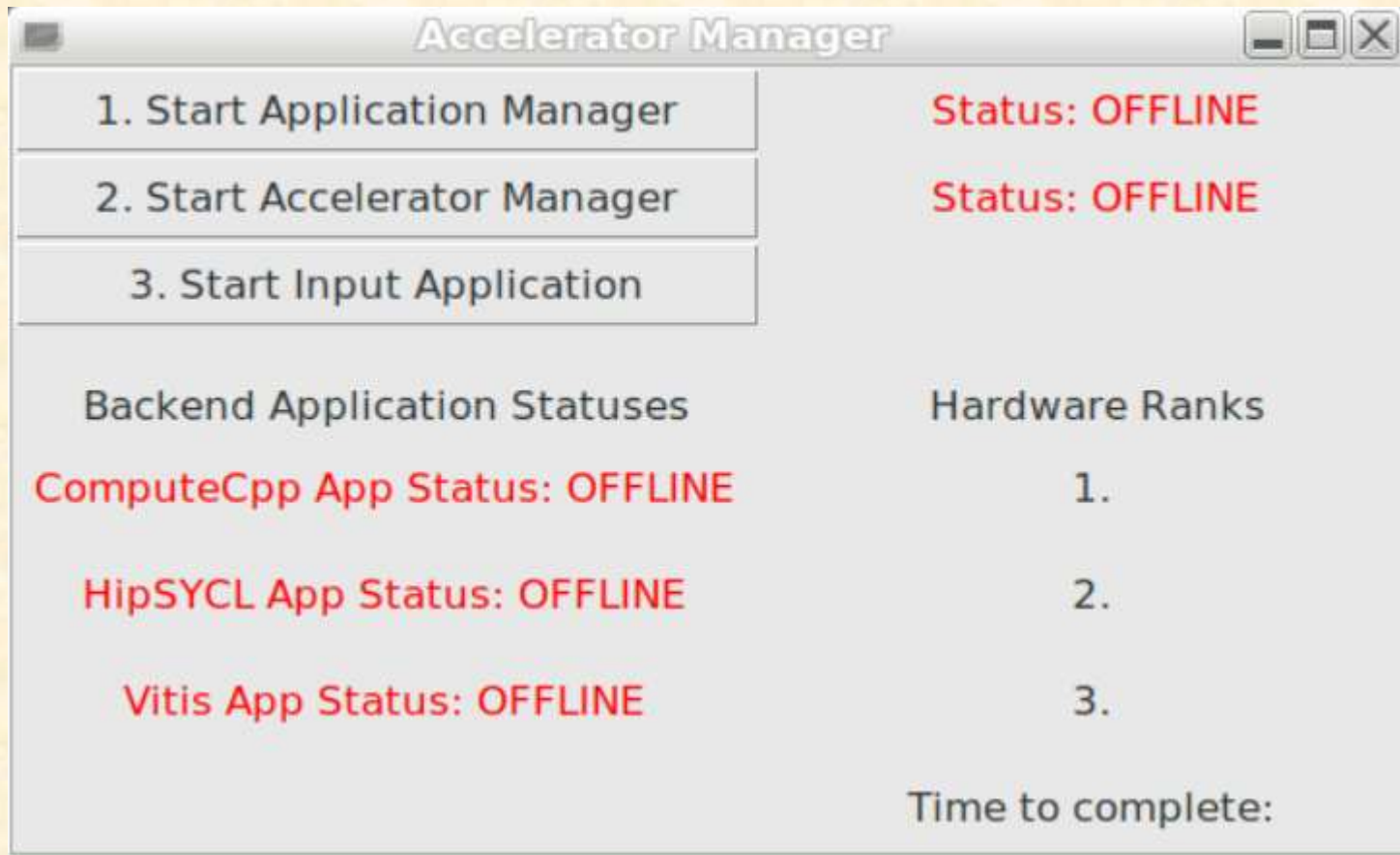
---

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

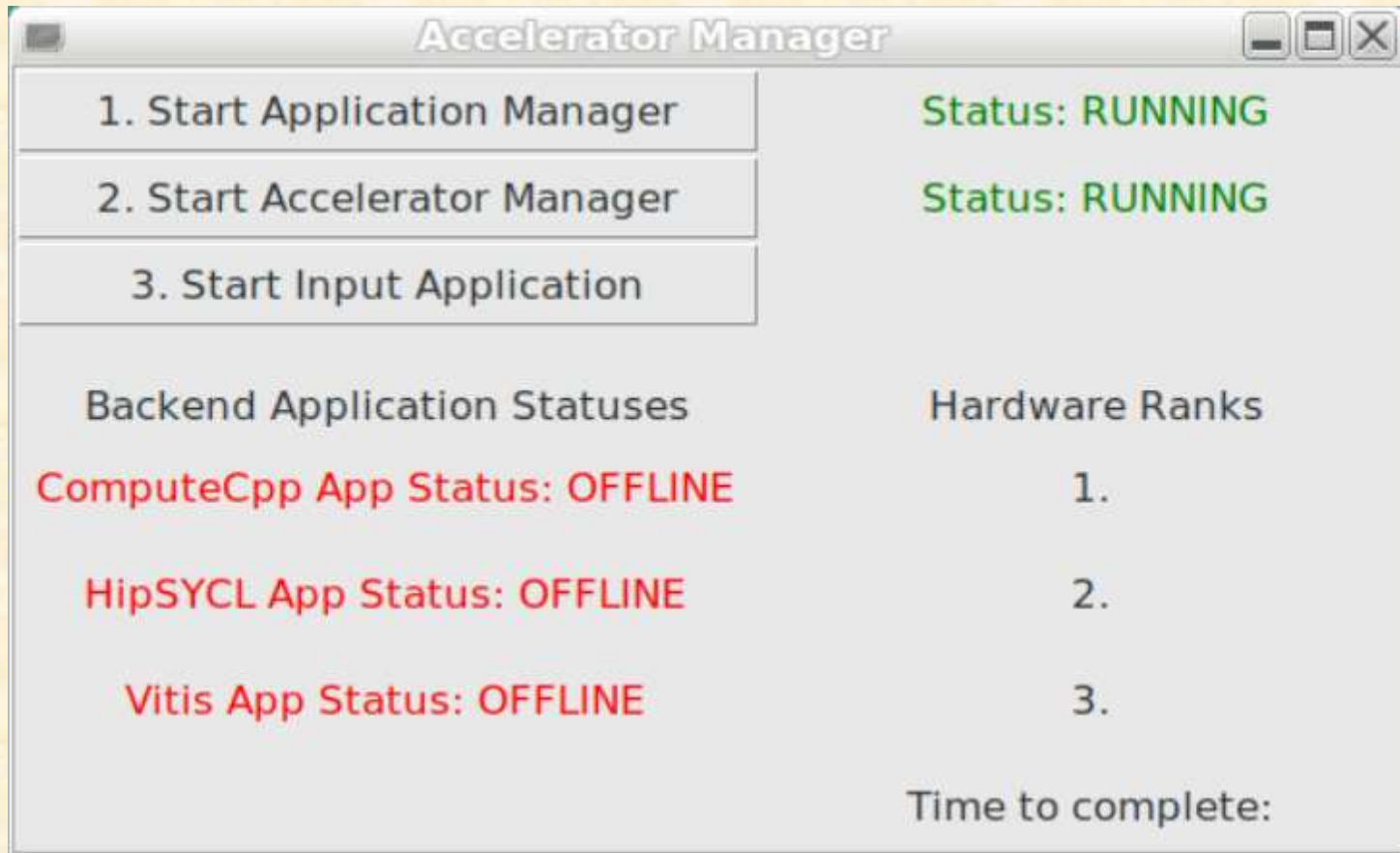
# System Architecture



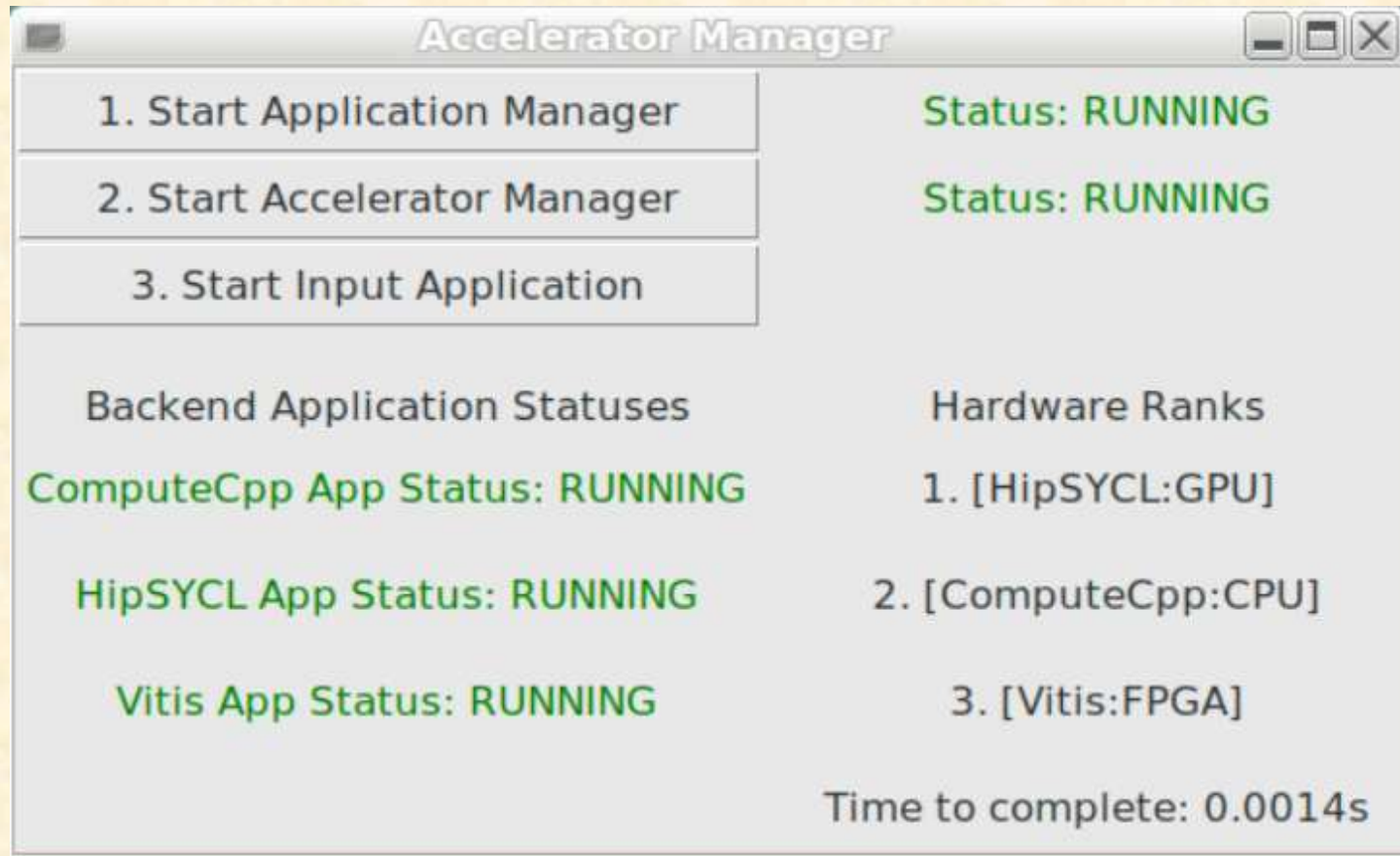
# App Interface: Initial



# App Interface: Startup



# App Interface: Final



# XILINX ZCU-102 FPGA



# What's left to do?

- Build additional backends
  - Vitis
  - Other SYCL Implementations
- Implement HW heuristic
- Integrate ML frameworks
- Standardize source and structs



# Alpha Demonstration

---

- Problem Description Animation
- Hardware Walkthrough
- Application Demonstration



# Questions?

---

?

?

?

?

?

?

?

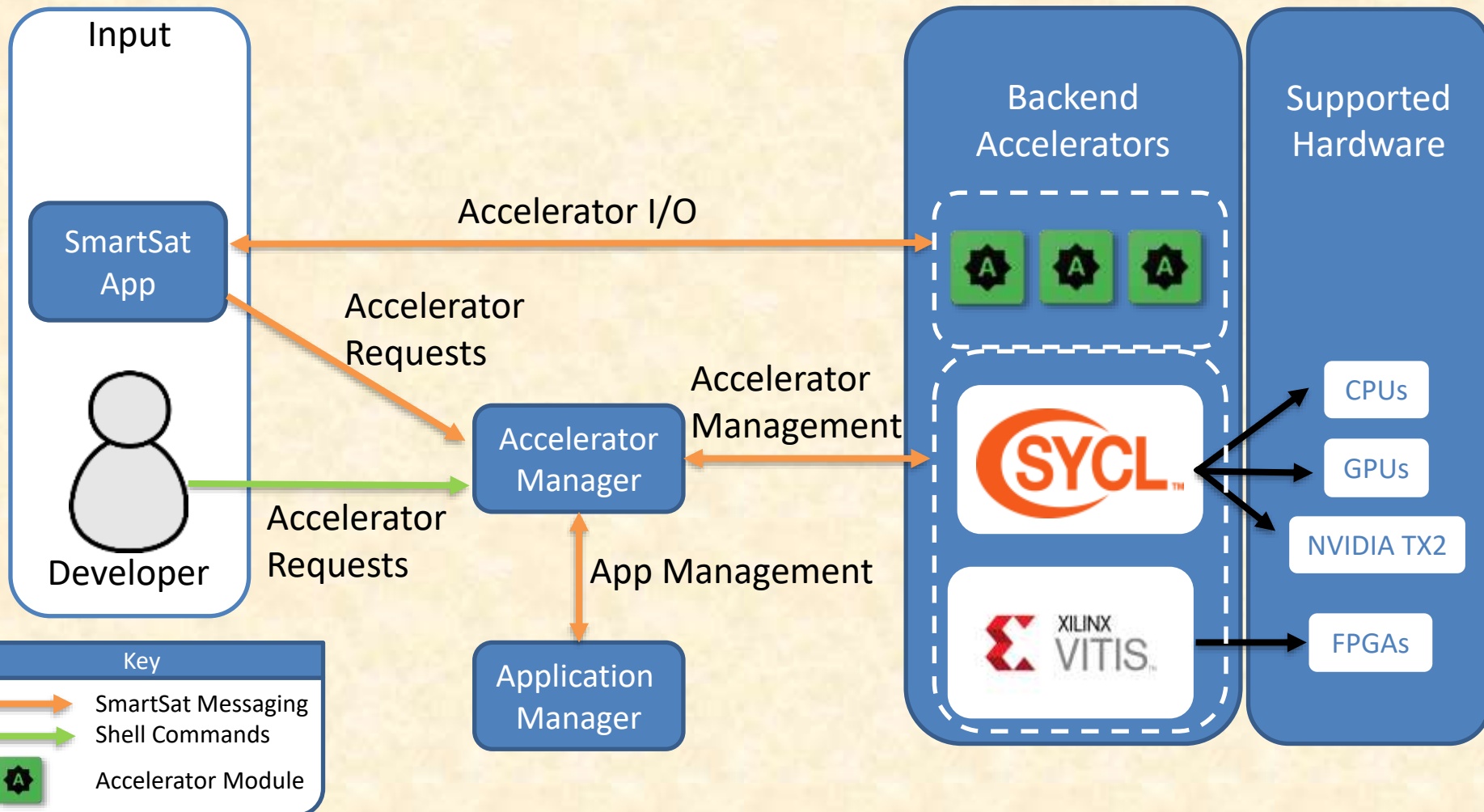
?

?

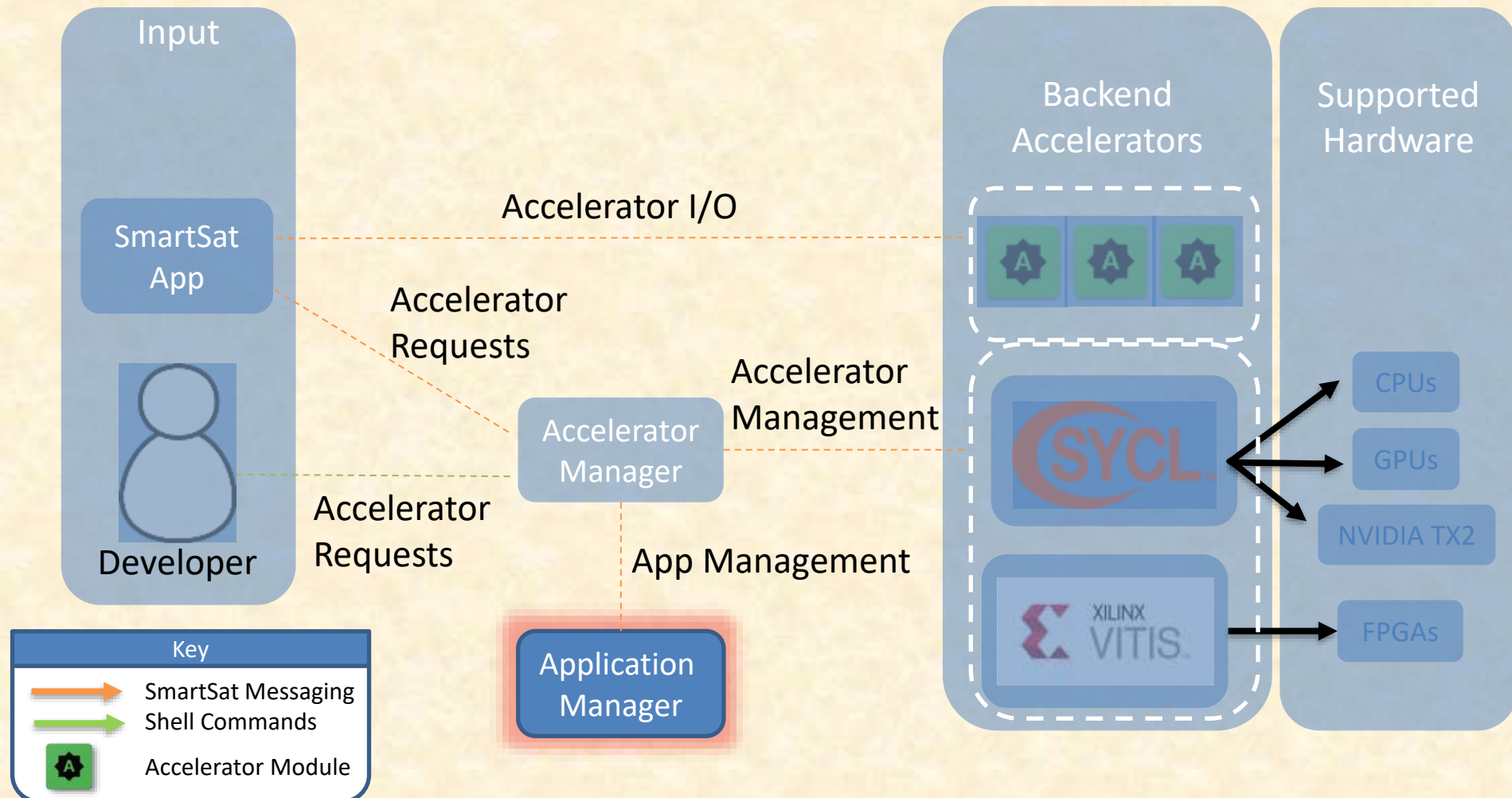




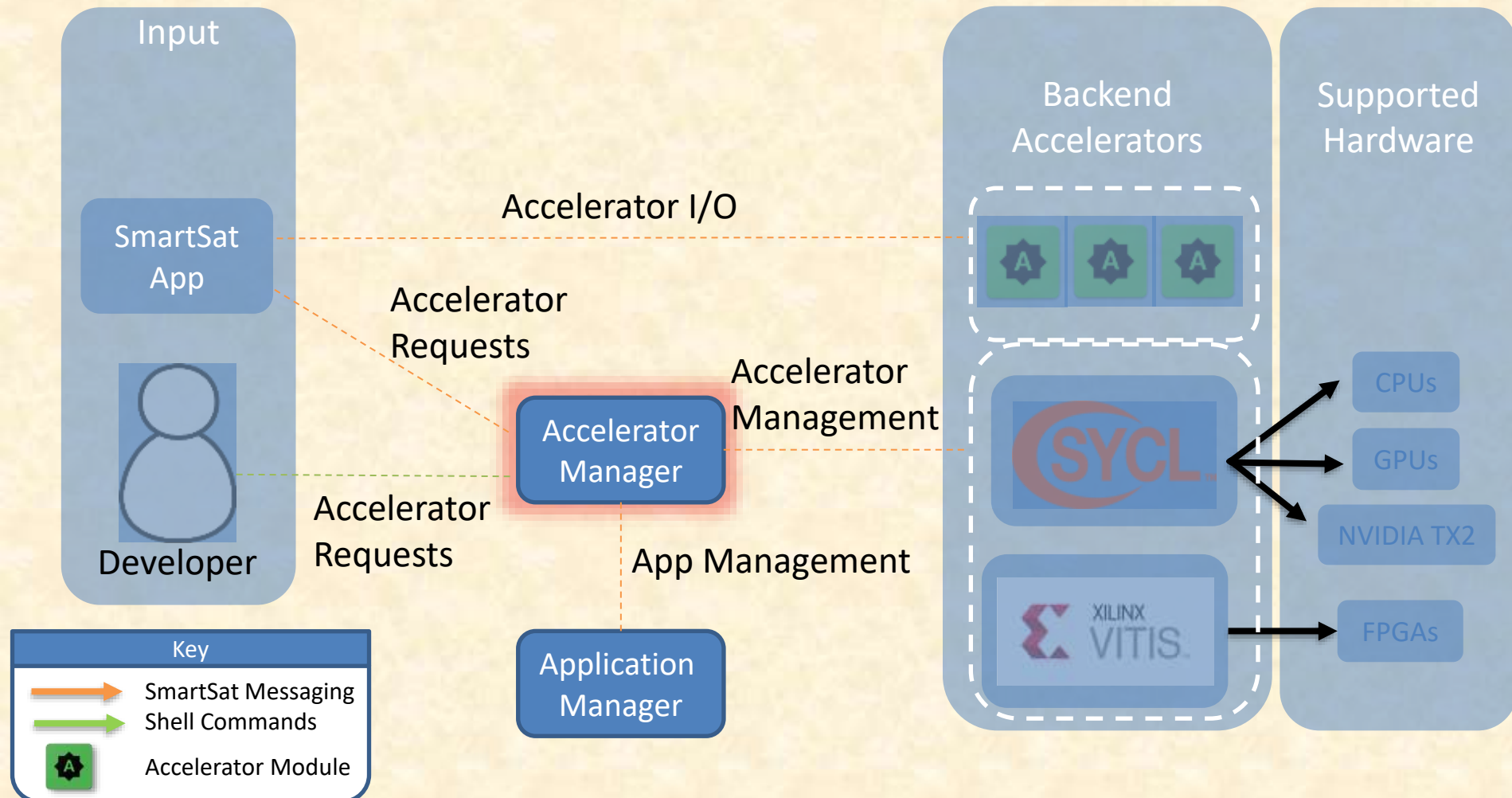
# What's happening?



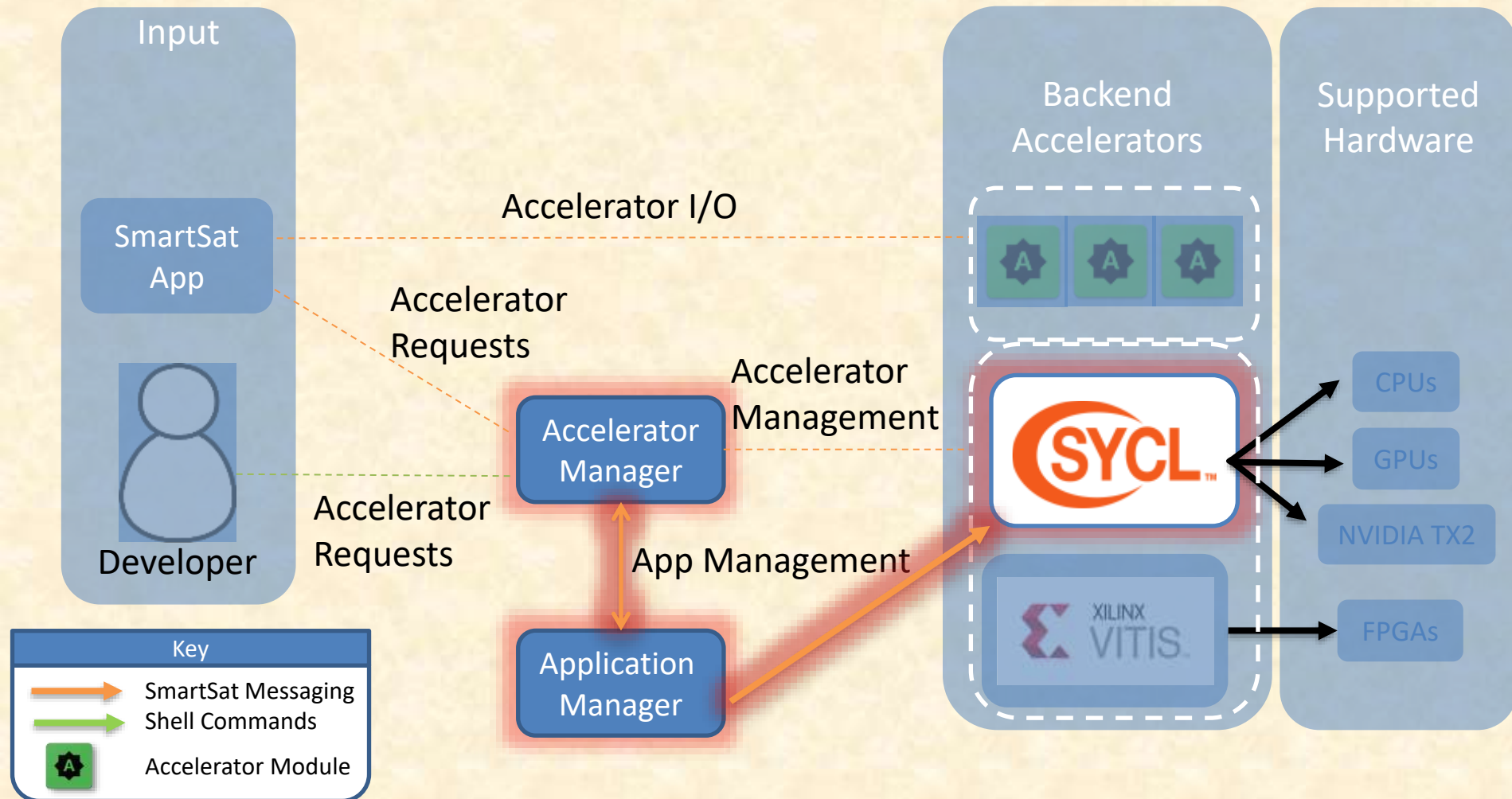
# What's happening?



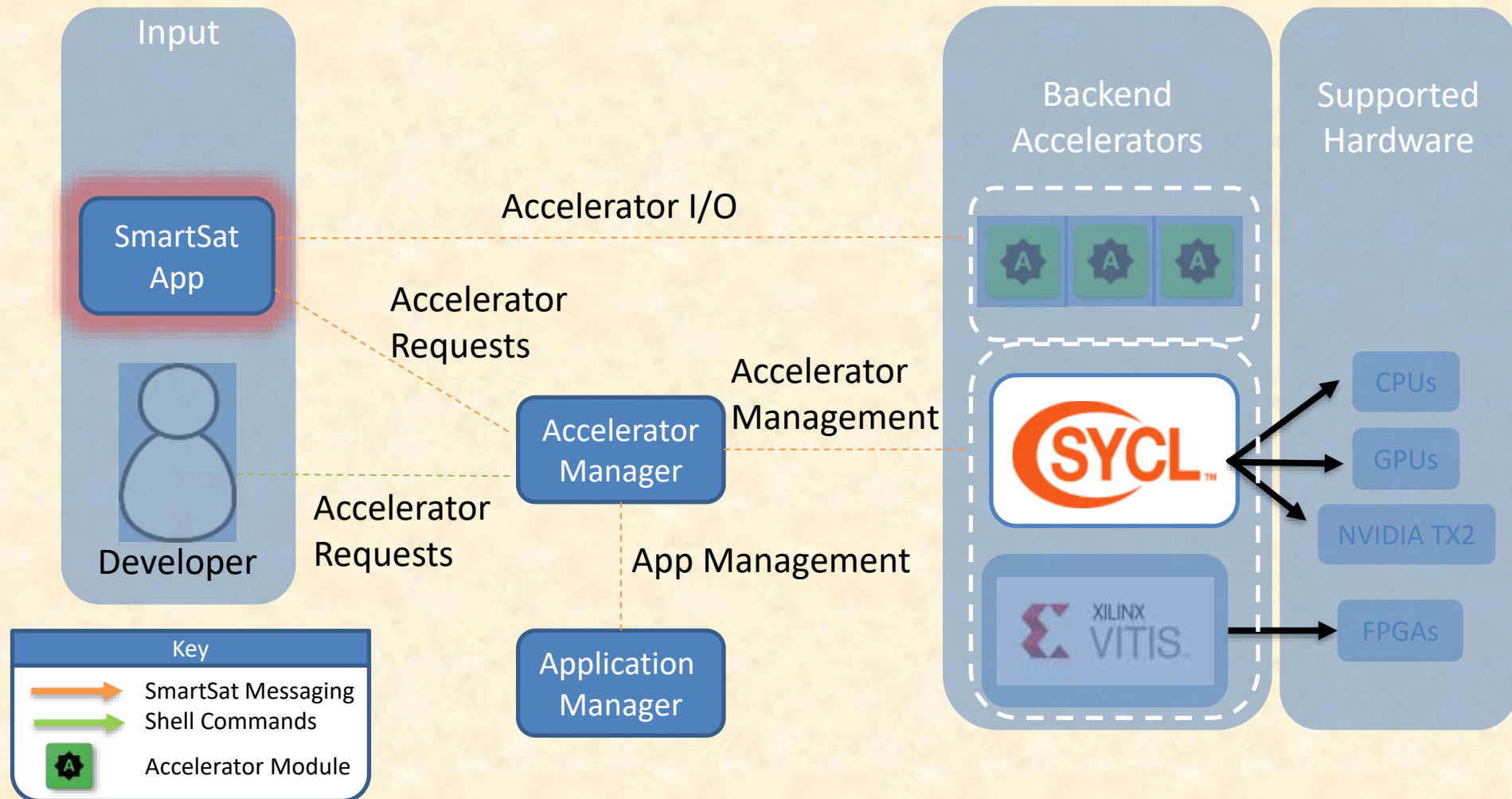
# What's happening?



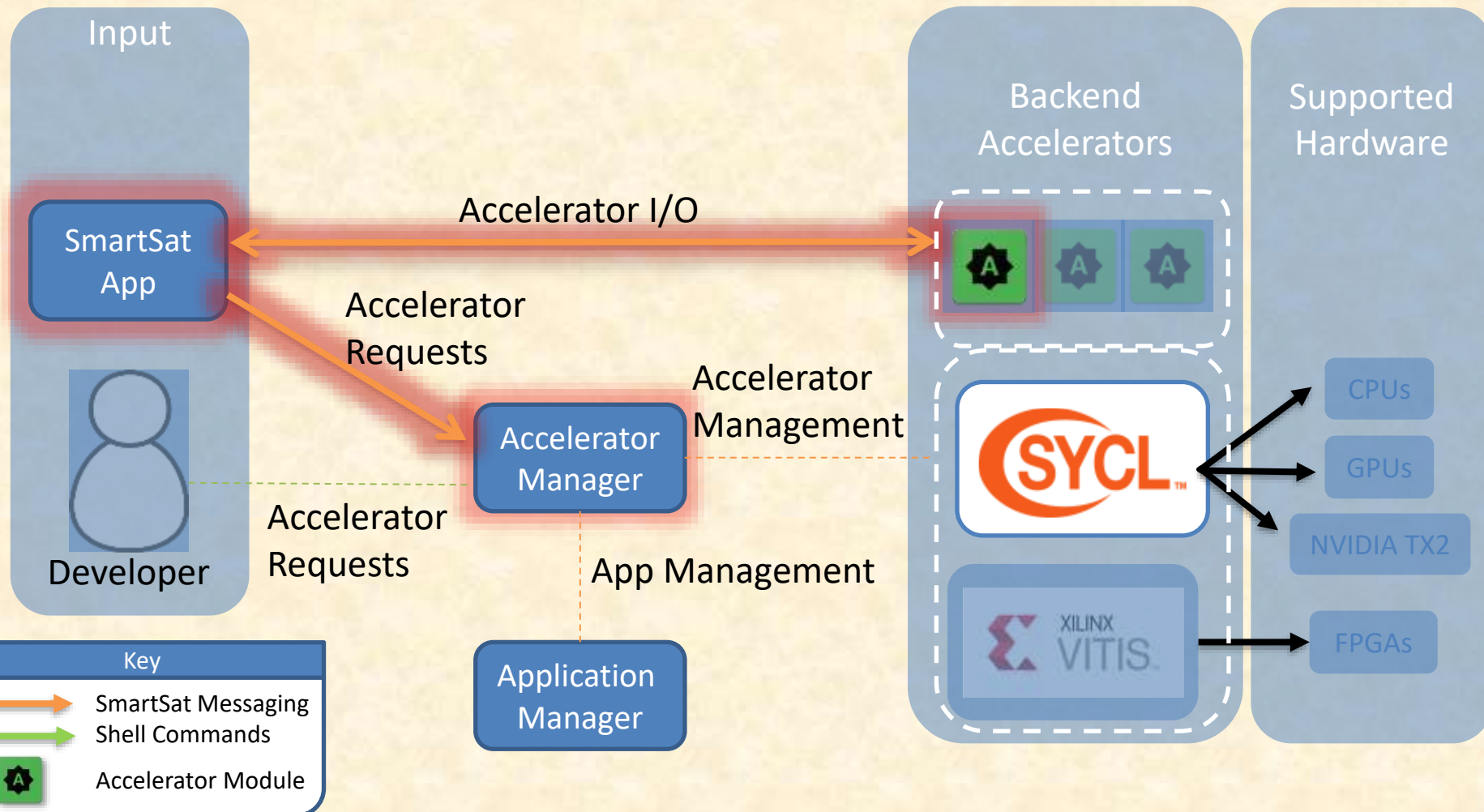
# What's happening?



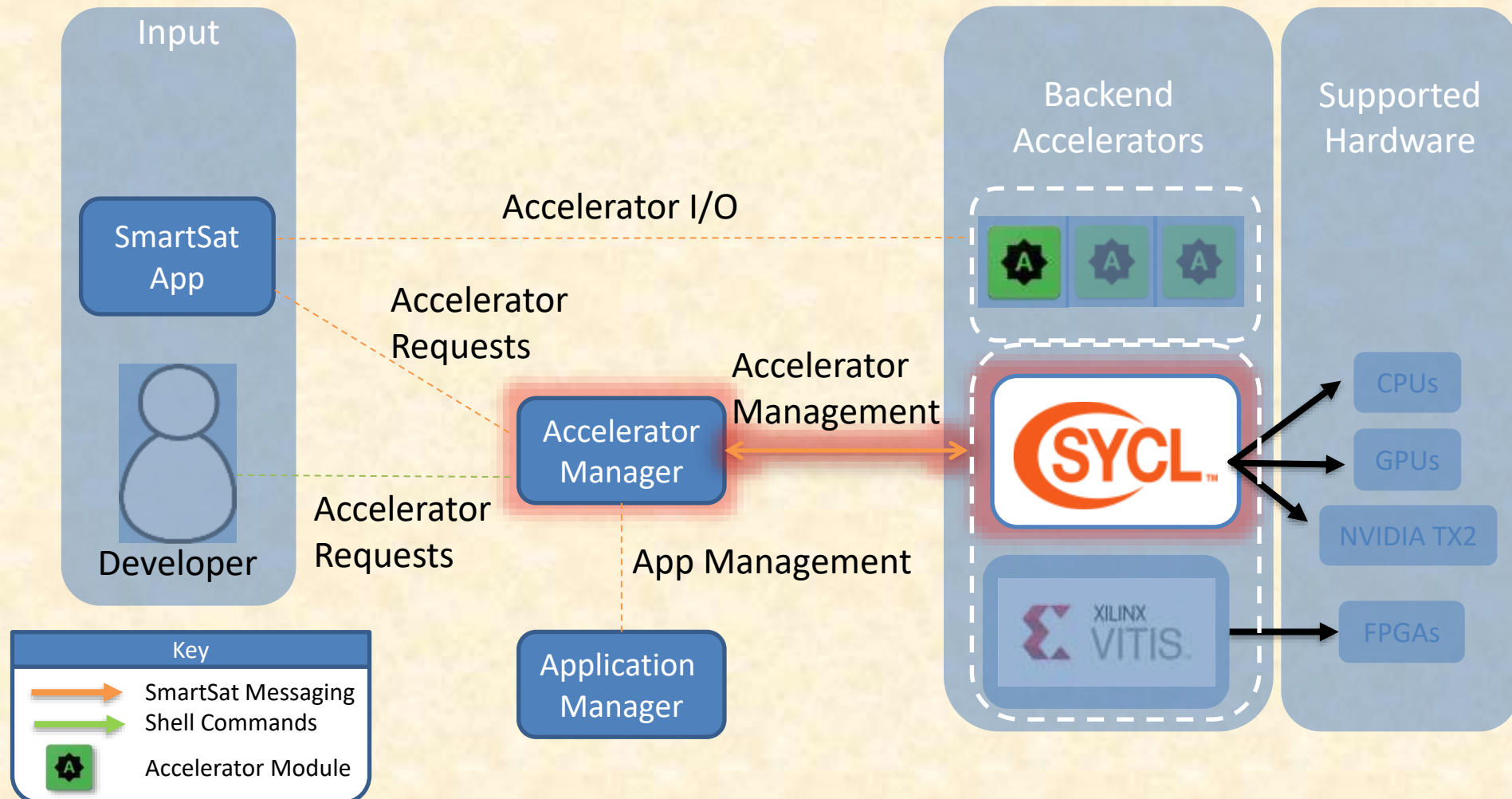
# What's happening?



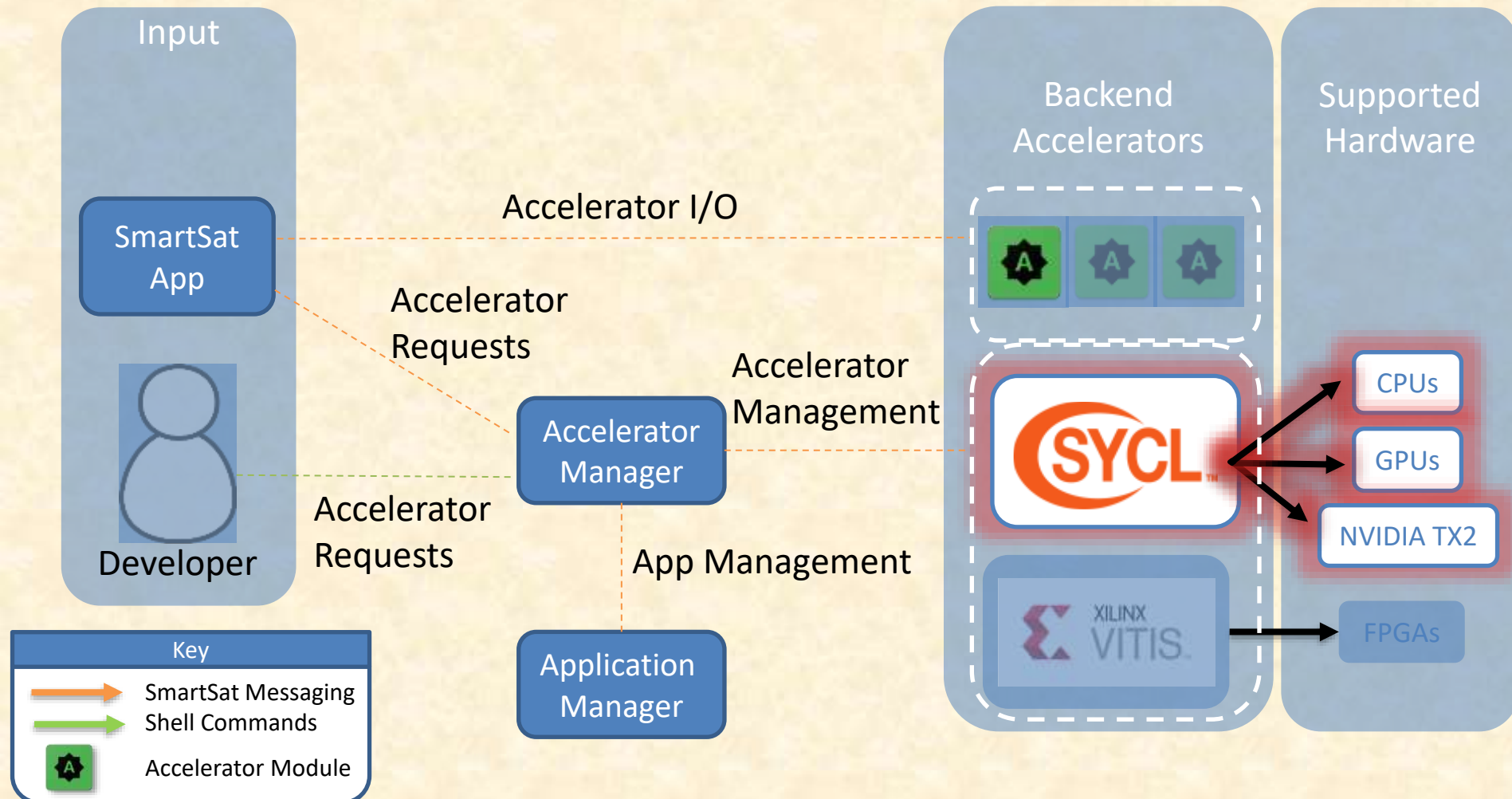
# What's happening?



# What's happening?



# What's happening?



# What's happening?

Return

