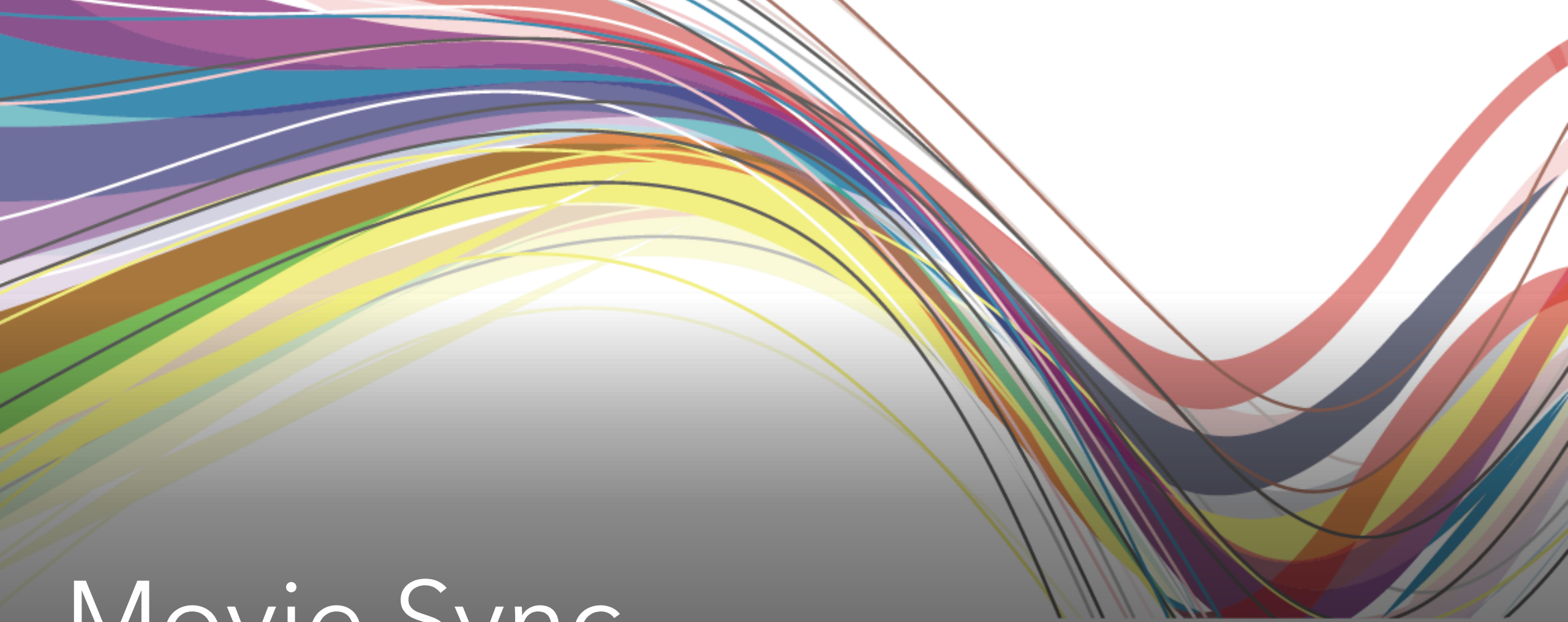


Movie Sync

ECE532 – Group 2: Rakib Ahmed, Isidor Brkic,
Daniel Campoverde, Luis Munoz

Movie Sync (Re)Introduction

Goal: an immersive video viewing experience

Controls LED color/intensity and video output

Similar products: Phillips HDMI Syncbox

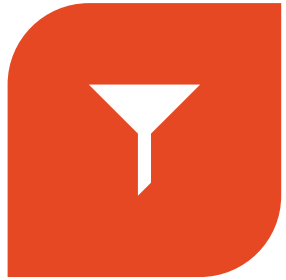
Our advantage: versatility

Works with any wifi-lights and HDMI sources

Project Goals

COLLECT AVERAGE COLOR AND INTENSITY

CONTROL LIGHTS OVER WI-FI



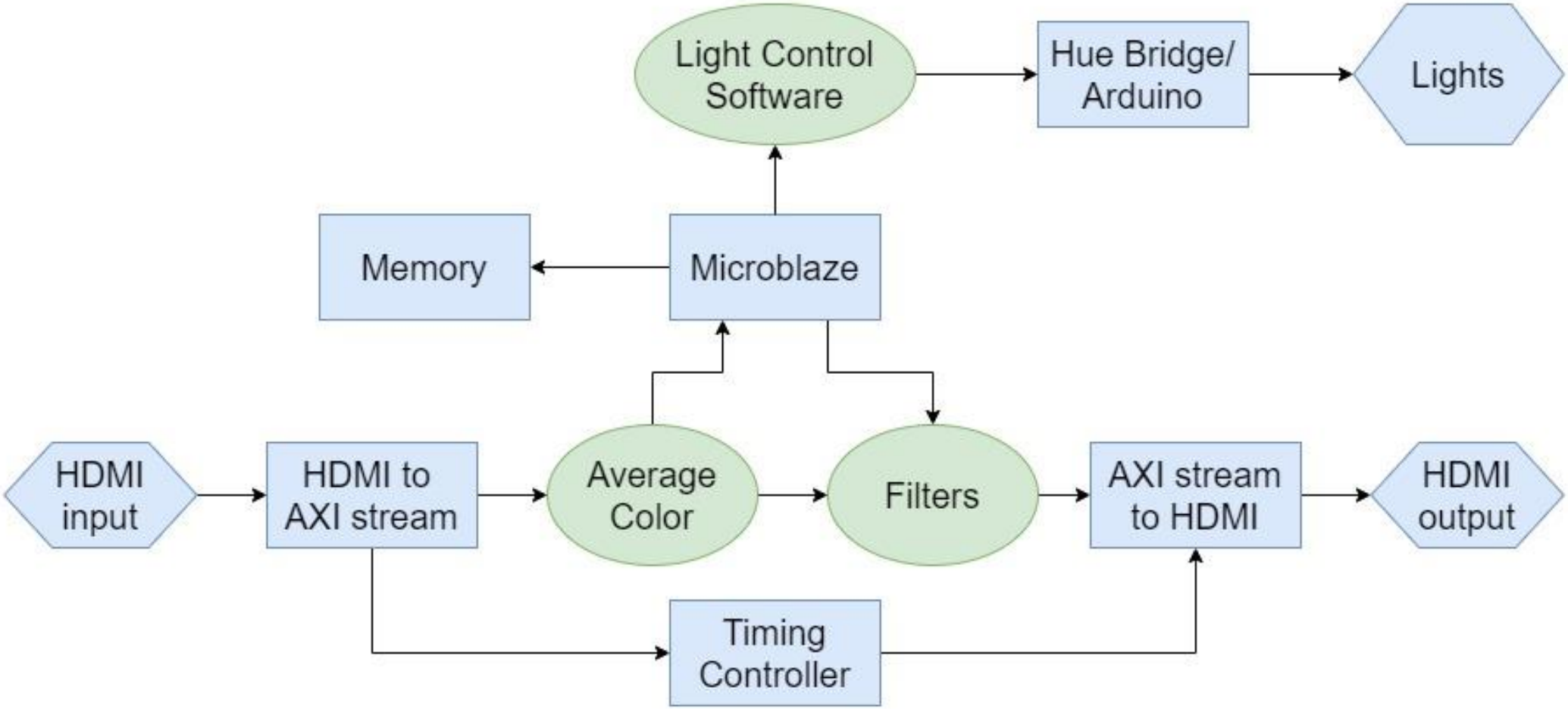
APPLY FILTERS

Design Process

Developed HDMI and Network subsystems in parallel

Developed both Ethernet and WiFi subsystems as contingency

Project Goals



Results - HDMI


Pass through

Streams 1080p video

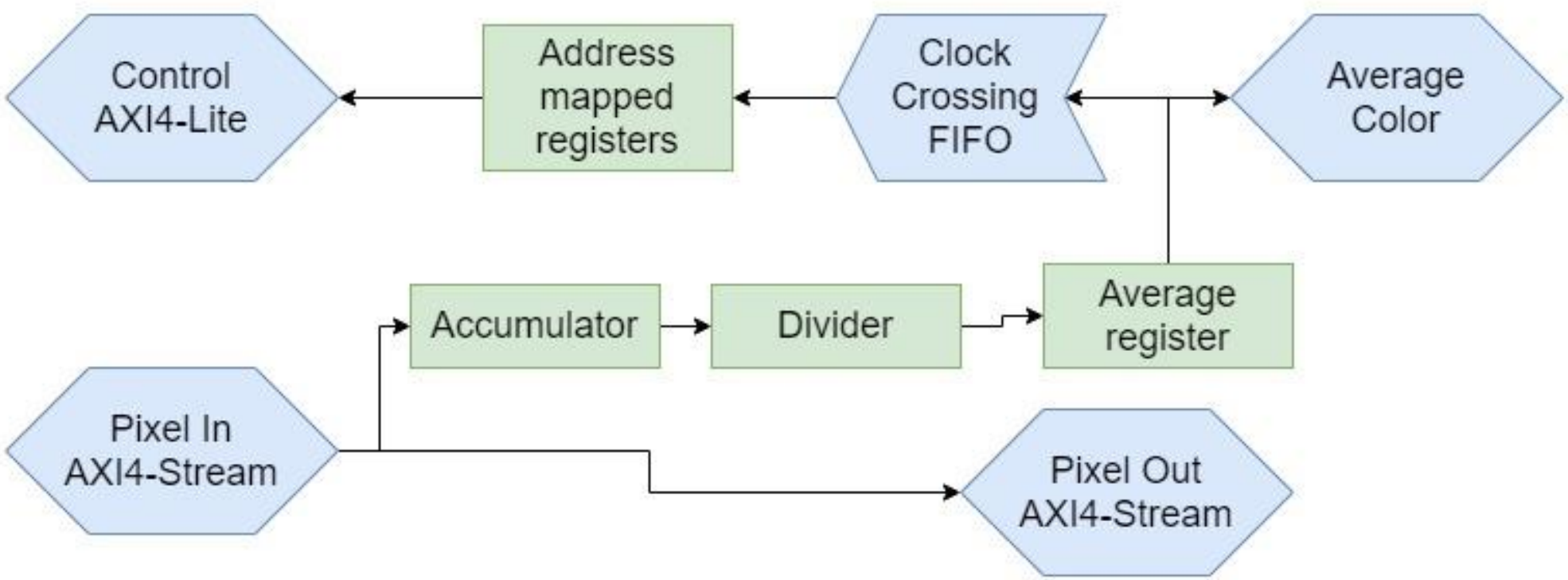

Averaging

Finds **global average** of each frame's color

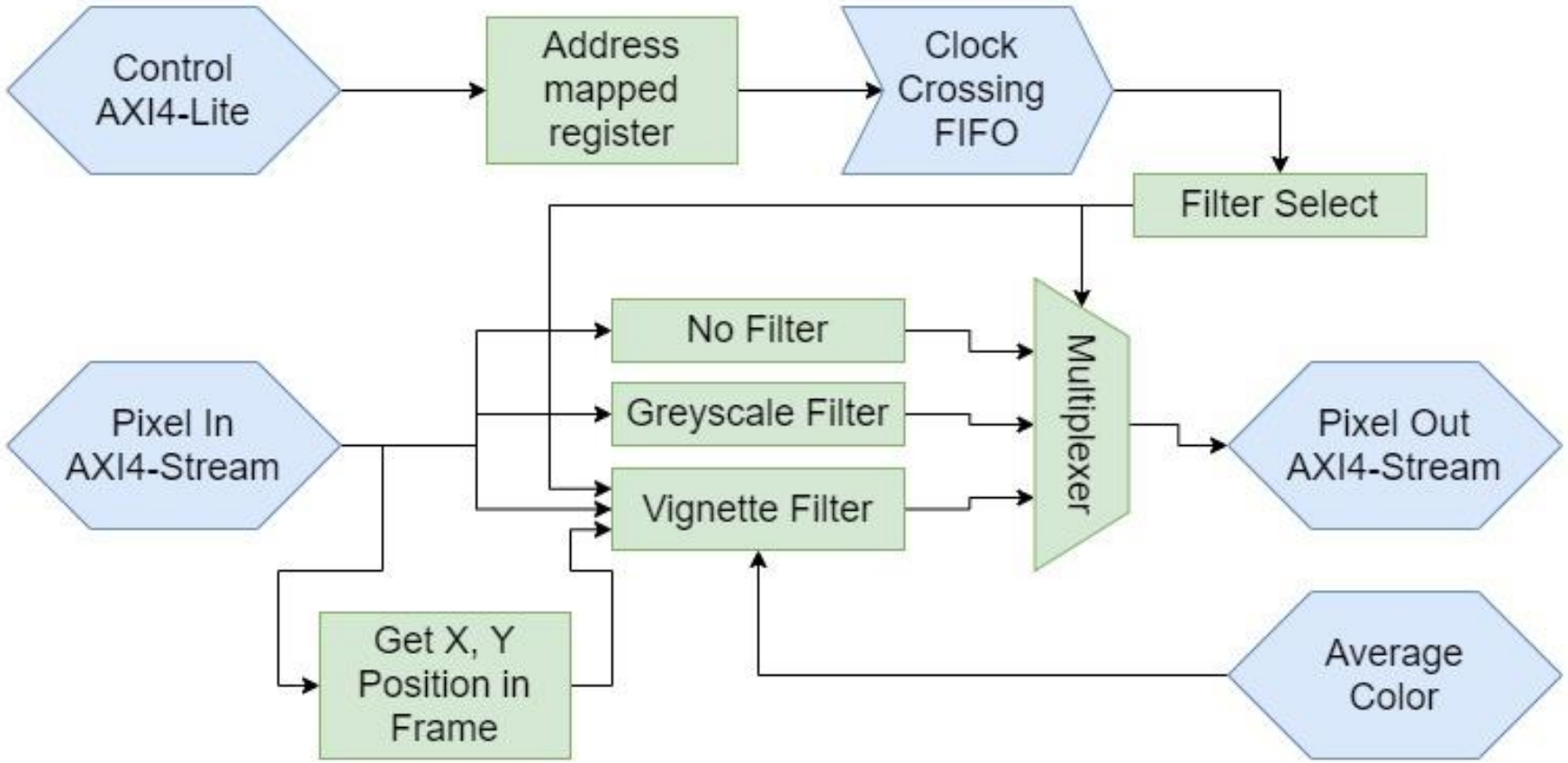

Filters

Selection controlled by Microblaze
No filter, Greyscale, Vignette to Black or **Vignette to Average**

Averager


Control
AXI4-Lite
Address
mapped
registers
Clock
Crossing
FIFO
Average
Color
Accumulator
Divider
Average
register
Pixel In
AXI4-Stream
Pixel Out
AXI4-Stream

Filter


Control
AXI4-Lite
Address
mapped
register
Clock
Crossing
FIFO
Filter Select
No Filter
Greyscale Filter
Vignette Filter
Multiplexer
Pixel In
AXI4-Stream
Pixel Out
AXI4-Stream
Get X, Y
Position in
Frame
Average
Color

Results - Network Interfaces

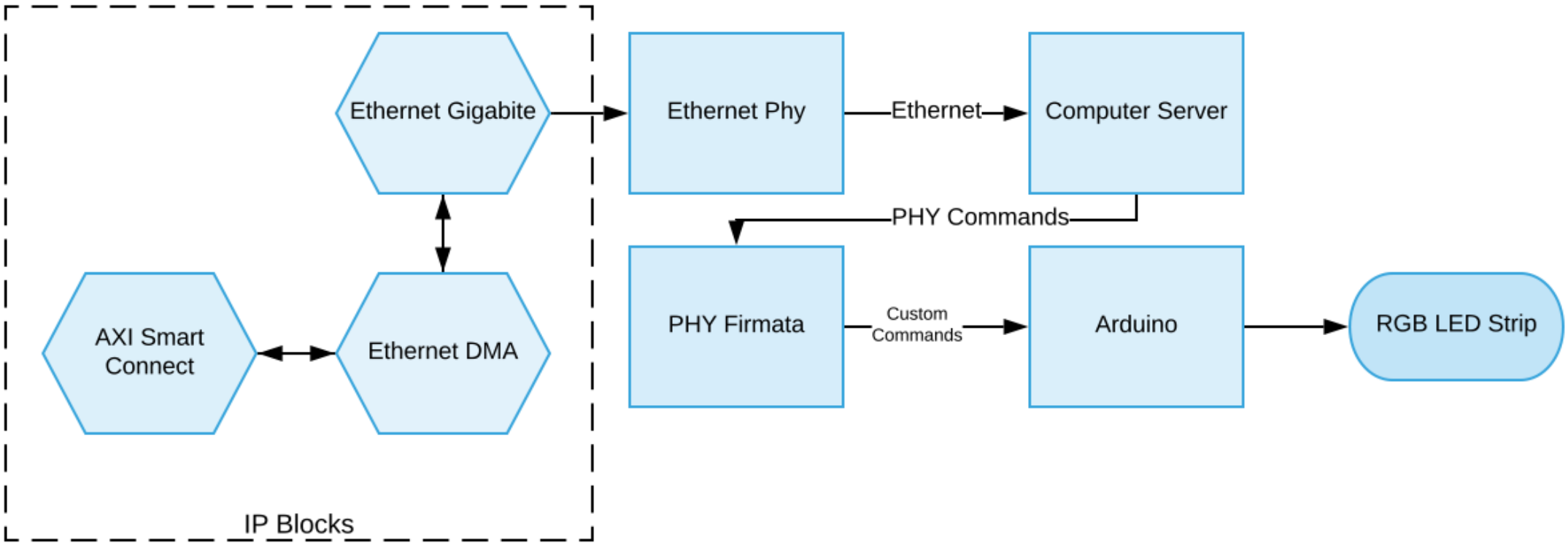
Ethernet

- **TCP** connection from **board** to host **computer**

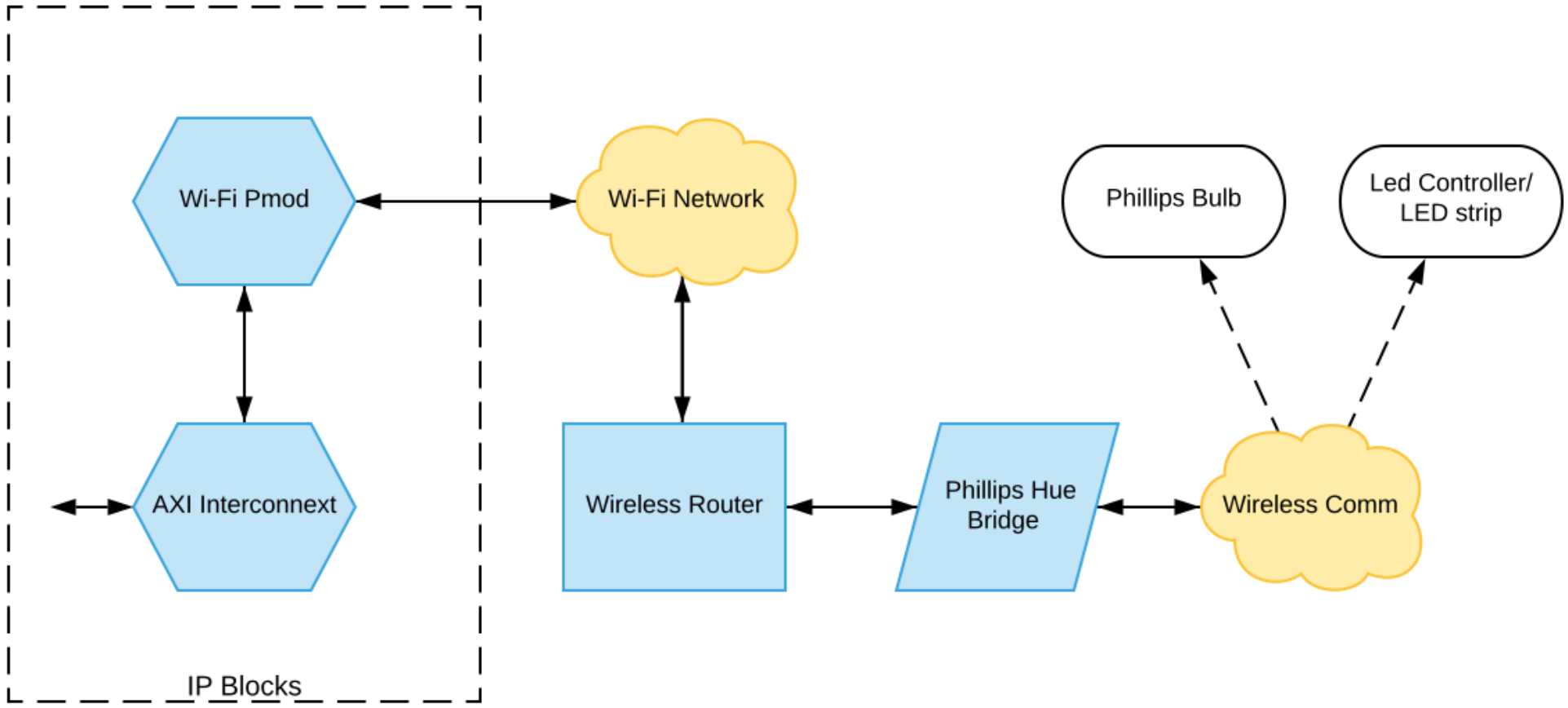
Wi-Fi

- **TCP** connection from **board** to Hue **bridge**

Ethernet Set-up



Wi-Fi Set-up


Wi-Fi Pmod
Wi-Fi Network
Phillips Bulb
Led Controller/
LED strip
AXI Interconnext
Wireless Router
Phillips Hue
Bridge
Wireless Comm
IP Blocks

WI-FI
(Best Option)

Pros:

- Existing APIs for light control
- More Flexibility
- Less Resource Utilization

Cons:

- Small Delays in Data Sent
- Wi-Fi Range

Challenges /Issues

HDMI Resolution: 1080p

WIFI Pmod Drivers: Vivado/SDK 2017.4

WIFI: Latency

WIFI and Ethernet: TCP Connections Issues

Philips Hue API vs “New” Comm Protocol

Ethernet Set-up Integration

Final Design Notes

5 AVAILABLE FILTERS

WI-FI AS MAIN IMPLEMENTATION

CONTROL OF MULTIPLE LIGHTNING DEVICES

MOVIE SYNC PROJECT WAS A SUCCESS

FUNCTIONALITY AS EXPECTED

Demo