

WQD7008 PROJECT

IMAGE PROCESSING WITH HADOOP IN RASPBERRY PI CLUSTER



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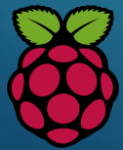
INTRODUCTION

This project was chosen to demonstrate the power of edge computing combined with distributed storage and processing using easily accessible hardware and open source software.

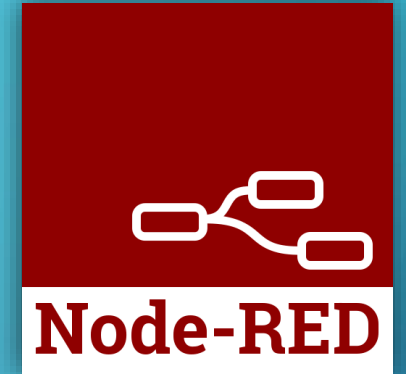
A broad range of application is possible, and for this project we chose images as our input data type. Using image files we will describe and demonstrate:

- The project methodology – block diagram of the whole flow.
- How we built a cluster of machines to implement Hadoop distributed storage & processing framework.
- How an application sitting on the 'edge' could transfer data to a distributed system (using Node-RED).
- How image processing is done using an image processing framework built on MapReduce.

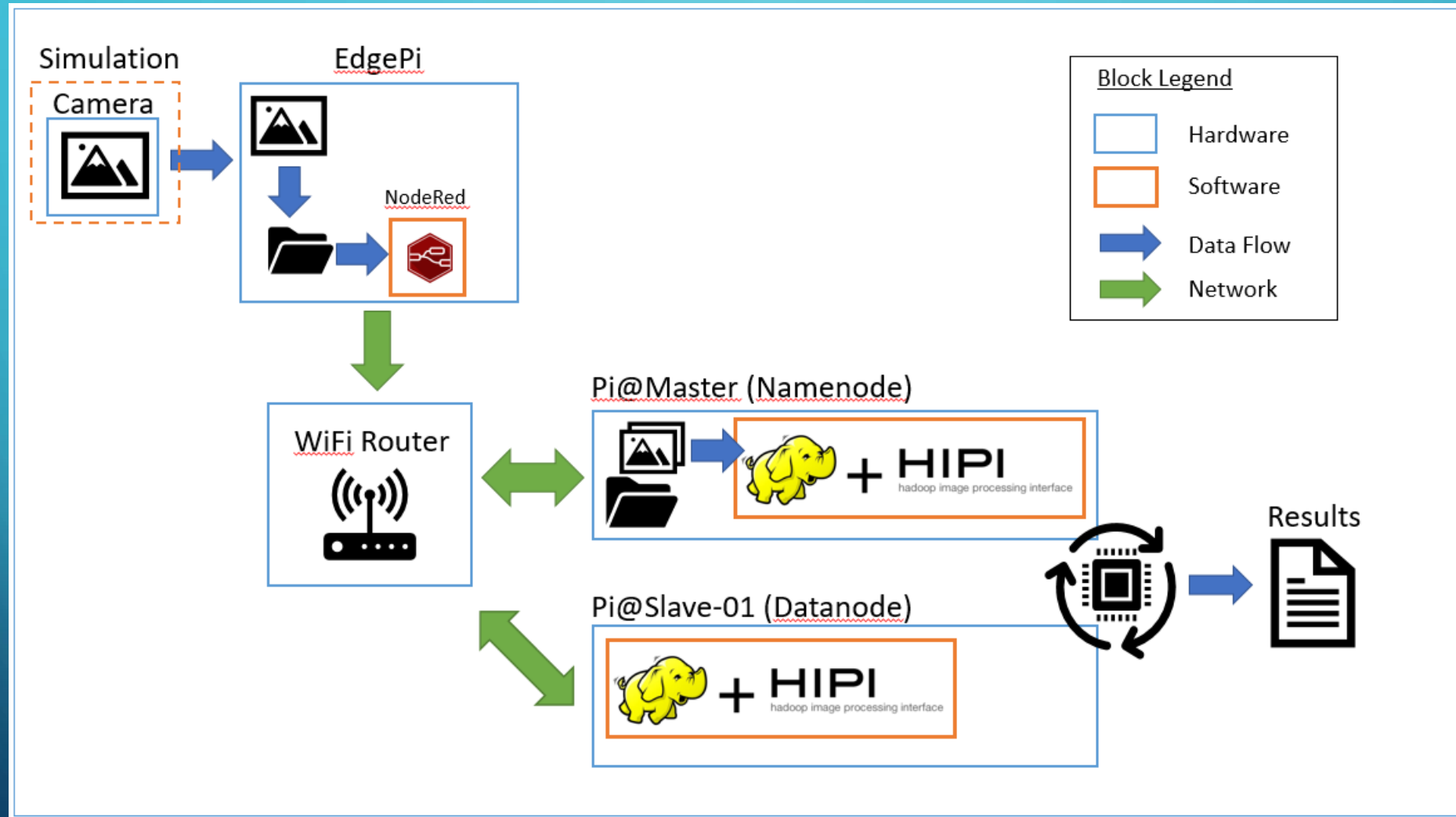
HARDWARE & SOFTWARE



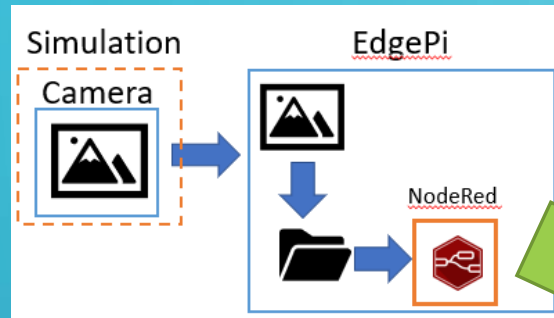
Raspberry Pi 4 Model B 4GB



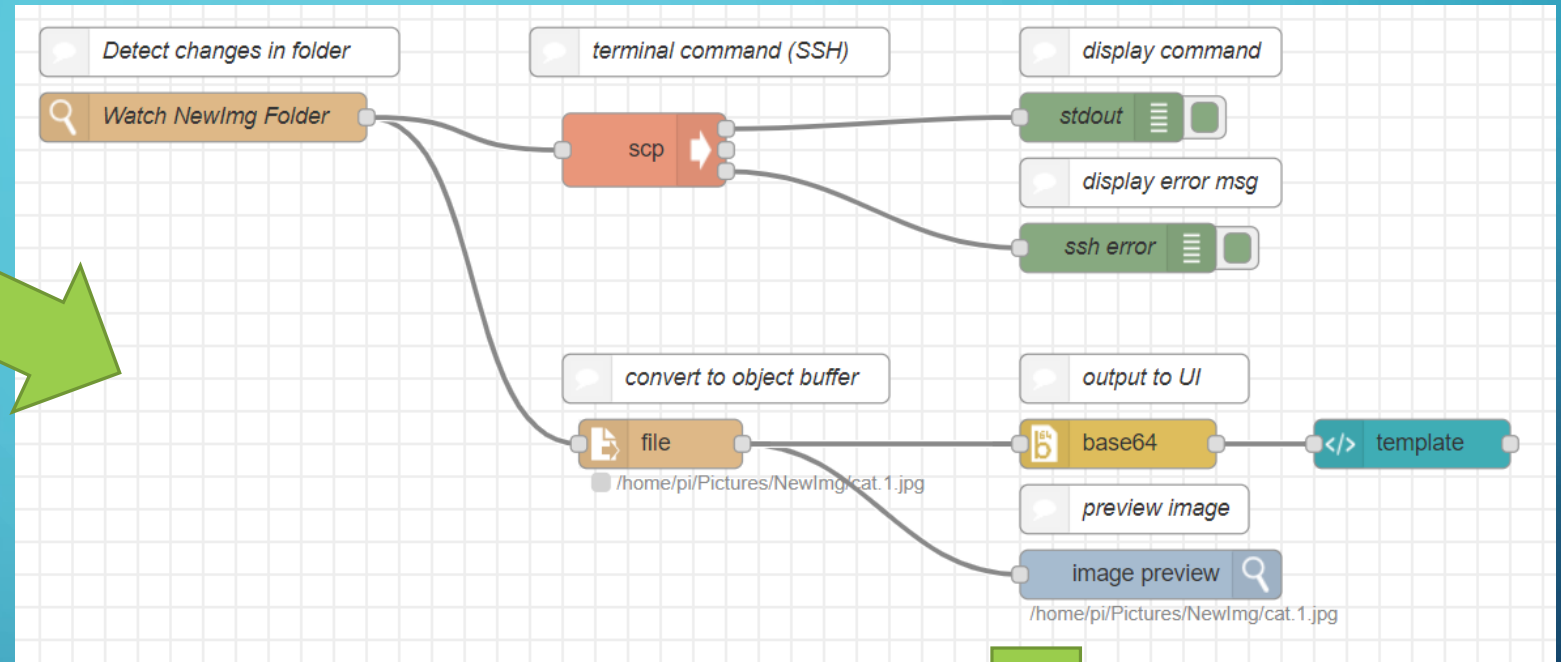
METHODOLOGY



PHASE 1 & 2 – EDGE NODE & DATA TRANSFER



- H/W: Raspberry Pi
- S/W: Node Red
- Watches for new images to be 'taken' and added to folder
- Send image through network using SSH to Master
- Preview image & convert image object to base64 display on dashboard

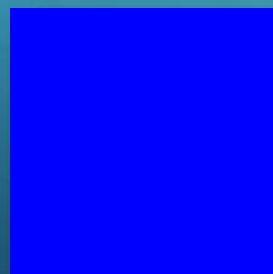


PHASE 3 – IMAGE PROCESSING



- Initiate HDFS to store images transferred from edge node
- HibImport tool in HIPI will then convert images into its primary input type (Hipi Image Bundle, HIB)
- MapReduce stage:
 - Mapper: compute the average pixel color over a single image
 - Reducer: sum up the averages and divide by their count to compute the total average pixel color

RESULT



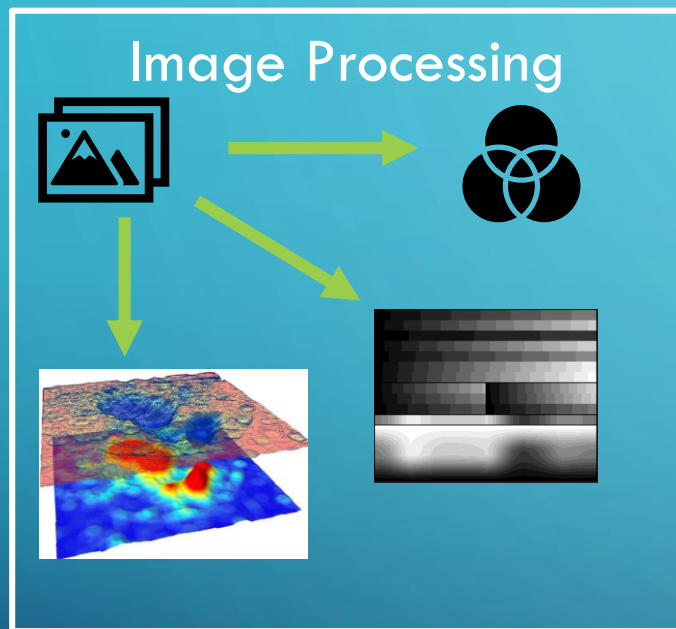
**Average Pixel
Value:**

R – 0.000102

G – 0.006789


B – 0.487370

FUTURE WORK - CLASSIFICATION



OR





Q&A

THANK
YOU