

Advanced Software Engineering



Team R

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Surveillance system components and setup

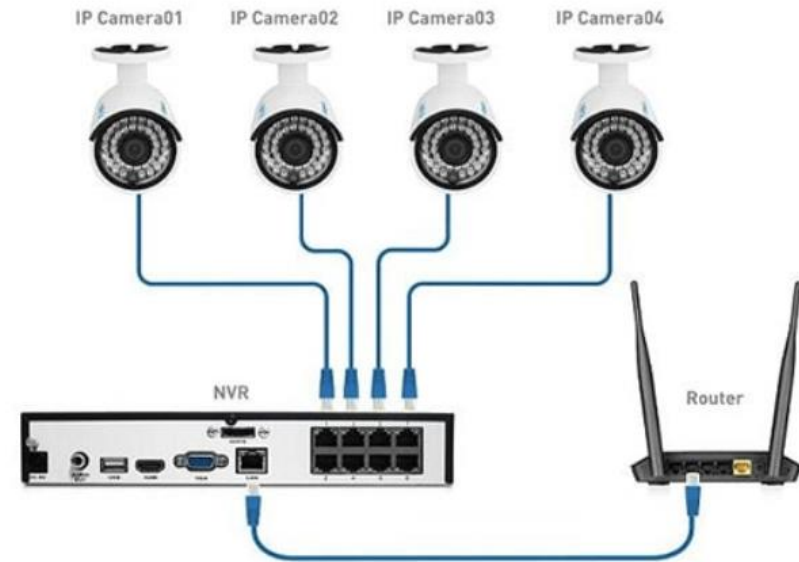
- IP cameras



- Wired connected cameras



- NVR/DVR



NVR/DVR disadvantages

Comparison	Full Form	NVR/DVR Cameras	Transmission Cables
NVR	Network Video Recorder	IP (Internet Protocol) Cameras	Ethernet Cables
DVR	Digital Video Recorder	Analog & Coax Based Cameras	Coax Cables

NVR



RJ45 ports for IP cameras

DVR



Coaxial ports for analog cameras

Wireless Surveillance system

What we will construct: We will implement a software stack that will provide a monitoring interface for the user to monitor his house remotely using IP cameras and/or cameras attached to low-cost edge devices.

System components:

- Edge devices (Raspberry pi)
- USB Cameras connected to edge devices
- IP cameras



Software implementation:

- Edge device server program
- Client's side program (Surveillance system client)

Advantages of our software

- Our software is aimed at those who want to monitor a specific area reliably and economically.
- Cheap webcams can not be standalone. The easiest and cheapest way is to attach the cameras to small edge devices like Raspberry Pi. Keep in mind that one Raspberry Pi can have more than one camera attached.
- Compared to other surveillance systems available on the market, our surveillance software has the advantage of being able to combine with high flexibility both high-definition IP cameras and cheap cameras that are attached to small devices.
- No cable installation required. Use only the wireless connection.
- Even laptops with built-in cameras can be used by our software.
- Using our software, you can monitor your house wherever you are by enabling the port forwarding service in the house router.
- Real time object detection using deep-learning models

Software that we will use

- Python3
- Tkinter window gui for desktop client's side application
- Pyro4 (Python remote objects)
- Opencv library
- rtsp streaming protocol
- Router port forwarding
- Balena cloud platform for monitoring the raspberry pi fleet remotely

Devices topology



IP camera

Edge device with connected camera



Surveillance system client



Streaming using rstp protocol

Streaming using RPC calls via Pyro4 remote objects



IP camera



Edge device with connected camera

Both the client and the cameras are in the same network



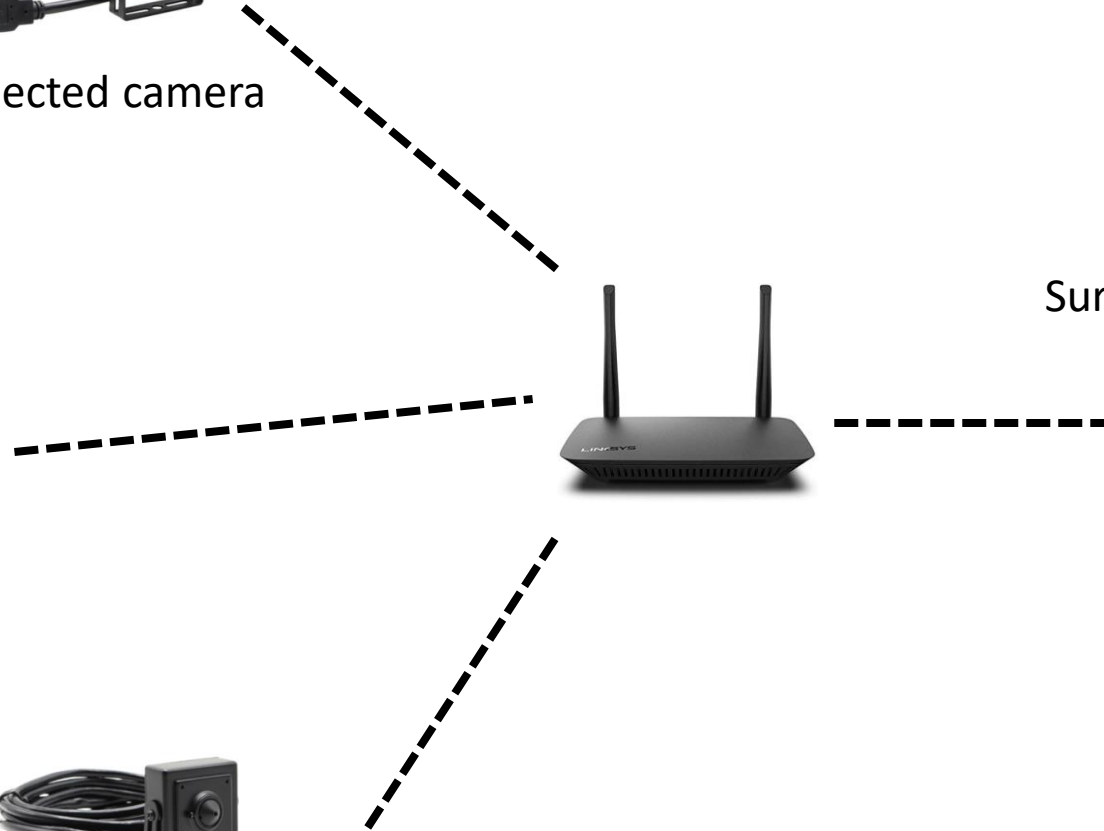
Edge device with connected camera



IP camera



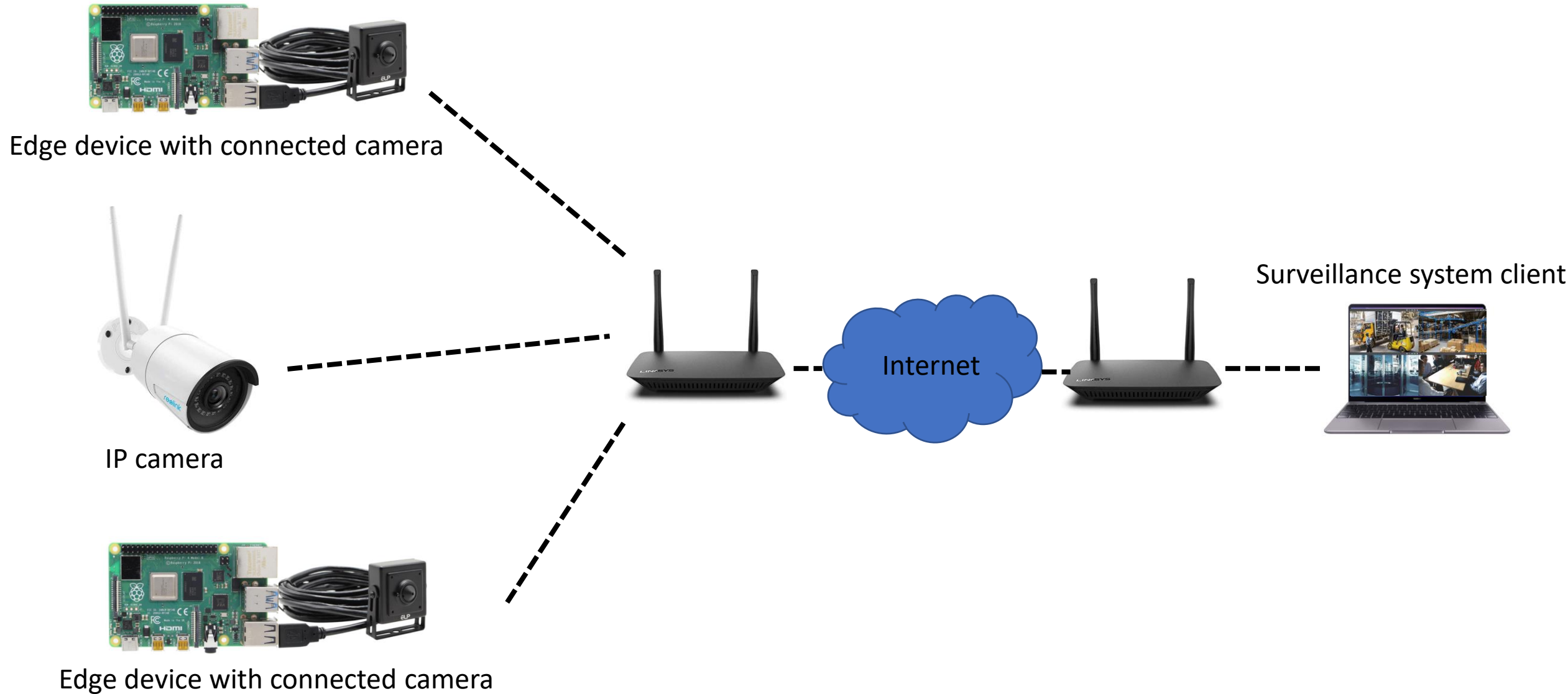
Edge device with connected camera



Surveillance system client

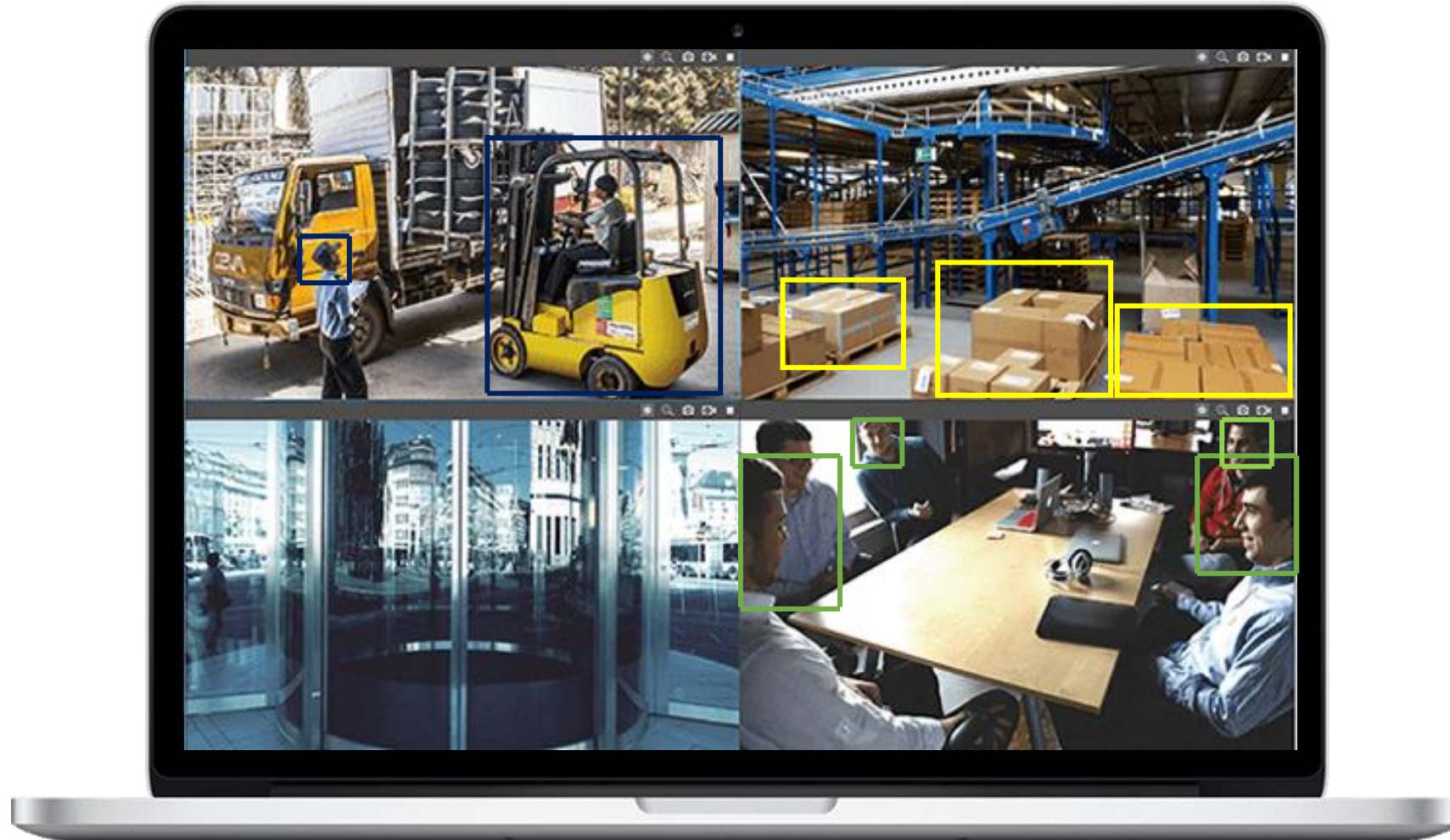


The client and the cameras are in a separate network



Surveillance system client's side

Our system performs real time object detection in each panel



Any Questions ?