

For Raspberry PI On-Premise IoT / Apache Kafka / TML Deployments:

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Below are suggested configurations – some fields may differ or may not apply

Server environment: zookeeper.version=3.6.1--104dcb3e3fb464b30c5186d229e00af9f332524b, built on 04/21/2020 15:01 GMT

Server environment: java.version=1.8.0_144

1. Install Java

- a. `sudo apt-get update`
- b. `sudo apt install default-jdk`

2. install TMUX: <https://linuxhint.com/install-tmux-ubuntu/>

- a. `sudo apt update`
- b. `sudo apt-get install tmux`
- c. `pgrep -f tmux` (kills all tmux sessions)
- d. `tmux a -t <session name>`

3. Cpu monitoring:

- a. `sudo apt update`
- b. `sudo apt install -y htop`

4. Install MySQL:

- a. `Sudo apt update`
- b. `Sudo apt upgrade`
- c. `sudo apt install mariadb-server`
- d. `sudo mysql_secure_installation`

5. Install Python

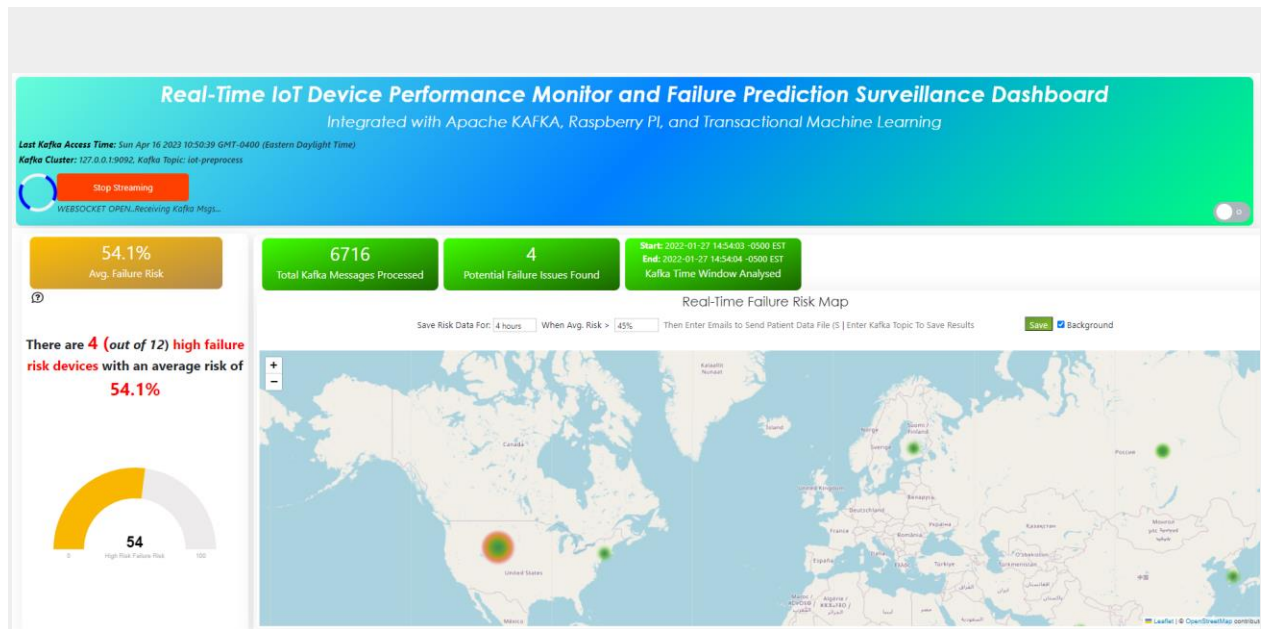
- a. `sudo apt-get install -y build-essential tk-dev libncurses5-dev libncursesw5-dev libreadline6-dev libdb5.3-dev libgdbm-dev libsqlite3-dev libssl-dev libbz2-dev libexpat1-dev liblzma-dev zlib1g-dev libffi-dev tar wget vim`
- b. `sudo mkdir Python`
- c. `sudo apt-get install libatlas-base-dev`
- d. `sudo chown pi:pi /home/pi/Python`
- e. `cd Python`
- f. `wget https://www.python.org/ftp/python/3.9.15/Python-3.9.15.tgz`
- g. `sudo tar -zxvf Python-3.9.15.tgz`
- h. `cd Python-3.9.15/`

- i. `./configure --enable-optimizations`
 - j. `sudo make altinstall`
 - k. confirm install:
 - i. `python -version`
 - ii. IF WANT TO REMOVE PYTHON:
 - 1. `sudo apt-get clean`
 - 2. `sudo apt-get autoremove --purge`
 - 3. `sudo apt-get remove python3.9`
 - 4. `sudo apt-get autoremove`
6. install MAADSTML python library
- a. `pip install maadstml`
 - b. `pip install requests`
 - c. `pip install nest_asyncio`
 - d. `pip install joblib`
 - e. `pip install asyncio`
7. Install TML Technologies for ARM chipset If using Pi 3+, for PI 4 using ARM64 binaries:
- a. Sudo `mkdir viper`
 - i. Copy viper (arm or arm64 i.e. `cp * /home/pi/viper`)
 - b. Sudo `mkdir hpde`
 - i. Copy hpde (arm or arm64)
 - c. Sudo `mkdir viperviz`
 - i. Copy viperviz (arm or arm64)
 - d. Copy viper-env-file from <https://github.com/smaurice101/raspberrypi/tree/main/viper-env-file>
 - i. Replace viper.env file with one above
 - e. IoTSolution - copy all Python scripts from Github: <https://drive.google.com/drive/folders/1wJEuFLVtOzu8R-yYh6ybMASAaKkvMaTw?usp=sharing>
 - i. `produce-iot-customdata.py`
 - ii. `preprocess-iot-monitor-customdata.py`
 - iii. `preprocess2-iot-monitor-customdata.py`
 - iv. Raw IoT Device Data: `IoTData.zip` and unzip data
 - v. IoT Lat/Longs: `downlaofdsntmlidmain.csv`
8. Start Apache Kafka: ZOOKEEPER
- a. Download Zookeeper-Kafka and unzip
 - i. [https://drive.google.com/file/d/1yCyAdSAQVC-ApD24BDwYU26WCnXW3vg/view?usp=share link](https://drive.google.com/file/d/1yCyAdSAQVC-ApD24BDwYU26WCnXW3vg/view?usp=share_link)
 - ii.
 - b. `export KAFKA_HEAP_OPTS="-Xmx512M -Xms512M"`
 - c. Edit `zookeeper/conf/zoo.cfg`
 - i. `tickTime=2000`
 - `initLimit=10`
 - `syncLimit=5`
 - `dataDir=/media/pi/sebusb/zookeeper # Don't put under /tmp, it will be deleted.`
 - `clientPort=2181`

- d. Cd to "zookeeper/kafka/bin"
 - e. Enter: `./zookeeper-server-start.sh`
`../config/zookeeper.properties` <enter>
9. Start Kafka in another terminal
- a. Kill port: `sudo kill -9 $(sudo lsof -t -i:3000)`
 - b. `export KAFKA_HEAP_OPTS="-Xmx512M -Xms512M"`
 - c. `./kafka-server-start.sh ../config/server.properties`
10. To SSH in to raspberry pi
- a. Use Raspberry Pi imager and flash OS
 - i. <https://www.raspberrypi.com/software/>
 - b. Click setting and enable SSH and Wifi
 - c. To manually enable wifi/ssh follow blog here:
 - i. <https://roboticsbackend.com/enable-ssh-on-raspberry-pi-raspbian/>

11. VISUALIZATION URL: Make sure to change IP address to the one given to your Raspberry PI:

- <http://192.168.2.27:9005/iot-failure-seneca.html?topic=iot-preprocess2,iot-preprocess&offset=-1&groupid=&rollbackoffset=500&topictype=prediction&append=0&secure=0>
- You should see a dashboard similar to this:



12. Increase swap file

- `sudo nano /etc/dphys-swapfile`
- `CONF_SWAPSIZE=2000`
- `sudo reboot`
- `free -m`