

Placement Empowerment Program

Cloud Computing and DevOps Centre

Write a Python Script to Monitor an Application : Create a Python script that sends periodic HTTP requests to your application and alerts you if it's down.

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Introduction

Ensuring high availability and reliability of an application is crucial for maintaining a seamless user experience. This Proof of Concept (PoC) focuses on developing a lightweight Python script to monitor the health status of an application by sending periodic HTTP requests.

Overview

Python Script to Monitor an Application

1. **Setting Up the Monitoring Environment:** Install Python and required libraries (requests, smtplib), and configure an email account for alerts.
2. **Making Periodic HTTP Requests:** Use requests to periodically send HTTP requests to the application URL.
3. **Defining Success and Failure Conditions:** Check HTTP response status codes (200 for success, non-200 for failure) to detect application status.
4. **Sending Email Alerts:** If the application is down, use smtplib to send an email alert to a specified recipient.
5. **Automating Periodic Checks:** Use an infinite loop (while True) to repeatedly check the application's status at regular intervals (e.g., every 60 seconds).
6. **Logging and Handling Errors:** Log any errors or failures and handle exceptions to ensure script reliability.

Objectives

Python Script to Monitor an Application

1. **Understanding Web Monitoring Fundamentals:** Learn how to periodically check the availability of web applications using HTTP requests.
2. **Practical Scripting Skills:** Gain hands-on experience in writing Python scripts that interact with web services and handle errors.
3. **Automated Alerting:** Develop a script that automatically detects application downtime and sends email notifications.
4. **Handling HTTP Status Codes:** Learn how to interpret HTTP status codes (e.g., 200, 404, 500) to assess the health of an application.

5. **Email Automation:** Gain experience in automating email alerts via SMTP to notify administrators when issues are detected.
6. **Improving Reliability:** Explore how to build a simple and reliable monitoring system that runs continuously to ensure your application is always available.

Importance

Python Script to Monitor an Application

1. **Proactive Monitoring:** The script ensures continuous monitoring of your application's health, allowing you to detect downtime before it impacts users.
2. **Real-Time Alerts:** Sending instant email notifications enables quick action, reducing the response time in addressing application issues.
3. **Improved Reliability:** Automated monitoring helps maintain application uptime, ensuring a more reliable service for users.
4. **Cost Efficiency:** By identifying and fixing issues early, you can avoid costly downtime and potential revenue loss.
5. **Skill Enhancement:** Writing and implementing this script improves your skills in web monitoring, error handling, and email automation.
6. **Scalable Monitoring:** This PoC can be expanded to monitor multiple applications or integrated into a larger system for enterprise-level monitoring

Step-by-Step Overview

Step 1: Install Python from Microsoft Store

1. Open the **Microsoft Store** on your computer.
2. In the search bar, type "**Python**" and press **Enter**.
3. Find the latest version of Python (e.g., **Python 3.x.x**), and click on it.
4. Click the **Install** button to install Python on your system.
 - This will automatically add Python to your system's PATH environment variable.



Step 2: Verify Python Installation

1. Open the **Command Prompt (CMD)**:
2. Type the following command to verify that Python is installed:

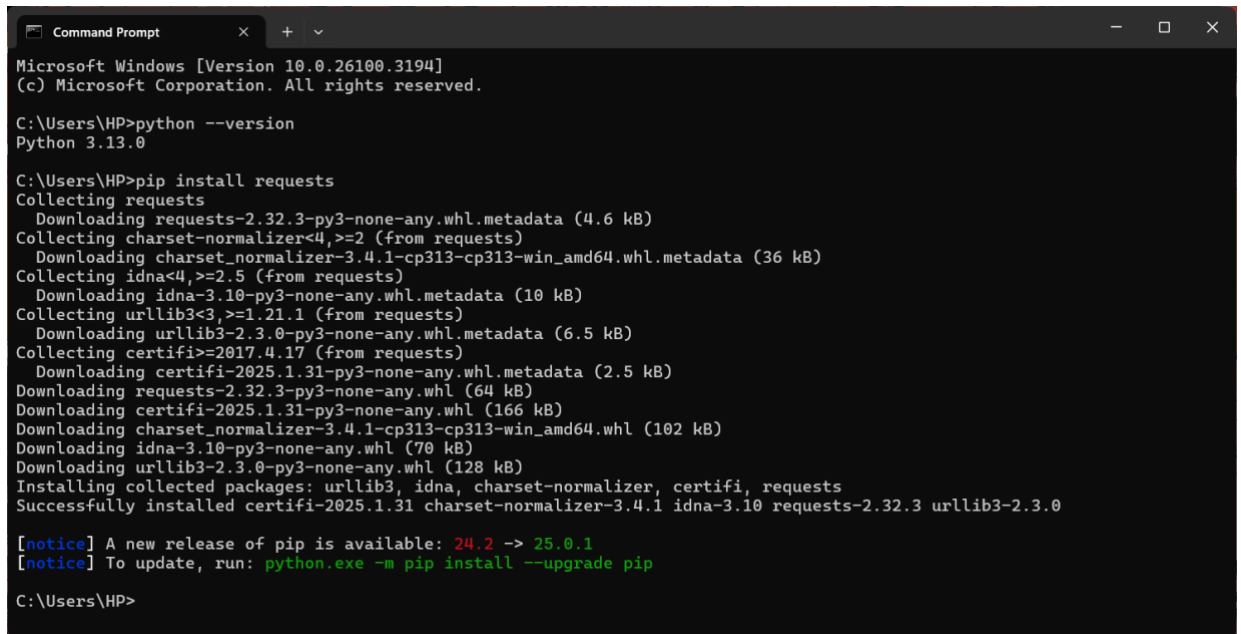
python --version

3. This should return the version of Python installed, e.g., Python 3.x.x.
4. If you see the version number, Python is correctly installed.

```
C:\Users\user>python --version
Python 3.12.9
```

Step 3: Install Required Libraries (requests, smtplib)

1. In **Command Prompt (CMD)**, type the following command to install the **requests** library:
pip install requests
2. The **smtplib** library is included with Python by default, so no installation is needed for it.



```
Microsoft Windows [Version 10.0.26100.3194]
(c) Microsoft Corporation. All rights reserved.

C:\Users\HP>python --version
Python 3.13.0

C:\Users\HP>pip install requests
Collecting requests
  Downloading requests-2.32.3-py3-none-any.whl.metadata (4.6 kB)
Collecting charset-normalizer<4,>=2 (from requests)
  Downloading charset_normalizer-3.4.1-cp313-cp313-win_amd64.whl.metadata (36 kB)
Collecting idna<4,>=2.5 (from requests)
  Downloading idna-3.10-py3-none-any.whl.metadata (10 kB)
Collecting urllib3<3,>=1.21.1 (from requests)
  Downloading urllib3-2.3.0-py3-none-any.whl.metadata (6.5 kB)
Collecting certifi>=2017.4.17 (from requests)
  Downloading certifi-2025.1.31-py3-none-any.whl.metadata (2.5 kB)
Downloading requests-2.32.3-py3-none-any.whl (64 kB)
Downloading certifi-2025.1.31-py3-none-any.whl (166 kB)
Downloading charset_normalizer-3.4.1-cp313-cp313-win_amd64.whl (102 kB)
Downloading idna-3.10-py3-none-any.whl (70 kB)
Downloading urllib3-2.3.0-py3-none-any.whl (128 kB)
Installing collected packages: urllib3, idna, charset-normalizer, certifi, requests
Successfully installed certifi-2025.1.31 charset-normalizer-3.4.1 idna-3.10 requests-2.32.3 urllib3-2.3.0

[notice] A new release of pip is available: 24.2 -> 25.0.1
[notice] To update, run: python.exe -m pip install --upgrade pip

C:\Users\HP>
```

3.

Step 4: Write the Python Script

1. Create a EC2 Instance
2. Open any **text editor** (e.g., Notepad, VS Code).
3. Copy and paste the Python script to monitor your EC2 instance (from your PoC).
4. Change your_email@example.com to your actual Gmail address (e.g., your_email@gmail.com).
5. Set smtp_user to your **Gmail** address as well.
6. Enter your **app-specific password** (not your Gmail password) for the smtp_password field. If you don't have an app-specific password, you can create one in your Google Account settings (in the **Security** section under **App passwords**)
7. Also Change the app_url to your Instance URL
8. Save the file with a **.py** extension, e.g., monitor_app.py

us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#instanceDetailsinstanceId=i-0436dda22588ad258

aws Search [Alt+S] United States (N. Virginia) Keerthika%20Ananthan

EC2 > Instances > i-0436dda22588ad258

EC2

- Dashboard
- EC2 Global View
- Events
- ▼ Instances
 - Instances
 - Instance Types
 - Launch Templates
 - Spot Requests
 - Savings Plans
 - Reserved Instances
 - Dedicated Hosts
 - Capacity Reservations
- ▼ Images
 - AMIs
 - AMI Catalog
- ▼ Elastic Block Store

Instance summary for i-0436dda22588ad258 (backup instance) Info

Updated about 1 hour ago

[Connect](#) [Instance state](#) [Actions](#)

Instance ID i-0436dda22588ad258	Public IPv4 address 44.212.42.238 open address	Private IPv4 addresses 172.31.82.246
IPv6 address -	Instance state Running	Public IPv4 DNS ec2-44-212-42-238.compute-1.amazonaws.com open address
Hostname type IP name: ip-172-31-82-246.ec2.internal	Private IP DNS name (IPv4 only) ip-172-31-82-246.ec2.internal	Elastic IP addresses -
Answer private resource DNS name IPv4 (A)	Instance type t2.micro	AWS Compute Optimizer finding Opt-in to AWS Compute Optimizer for recommendations. Learn more
Auto-assigned IP address 44.212.42.238 [Public IP]	VPC ID vpc-00cb0e34db0b601d4	

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```
*Untitled - Notepad
File Edit Format View Help
#Email configuration
sender_email"keerthianand62@gmail.com"
receiver_email "keerthianand62@gmail.com"
smtp server "smtp.gmail.com"
smtp port 587
smtp user "yasvanthrajanrajan7@gmail.com"
Dsmtp password "yasvanth@123" Your app-specific password
Application to monitor
app url "https://us-east-1.console.aws.amazon.com/ec2/home/region-us-east-1#InstanceDetailsinstanceId=i-0436dda22588ad258"
with your app's URL
Function to send an email alert
def send_alert_email():
try:
Create message
message MIMEMultipart()
message["From"] sender_email message["To"] receiver_email
message["subject"] "Application Down Alert"
body "Your application is down. Please check it immediately!"
message.attach(MIMEText (body, "plain"))
```

Step 6: Run the Python Script

1. In **Command Prompt (CMD)**, navigate to the folder where the Python script is saved using the `cd` command:

```
cd path\to\your\script\directory
```

2. Run the script with the following command:

```
python monitor_app.py
```

.

```
Microsoft Windows [Version 10.0.26100.3194]
(c) Microsoft Corporation. All rights reserved.

C:\Users\HP>cd documents

C:\Users\HP\Documents>cd app.py
The directory name is invalid.

C:\Users\HP\Documents>app.py
Application is up! Status code: 200
```

Step 7: Stop the Script

To stop the script at any time, press **Ctrl + C** in the **Command Prompt** window.

```
C:\Users\HP\Documents>app.py
Application is up! Status code: 200
Traceback (most recent call last):
  File "C:\Users\HP\Documents\app.py", line 64, in <module>
    monitor_application()
    ^^^^^^^^^^^^^^^^^^^^
  File "C:\Users\HP\Documents\app.py", line 60, in monitor_application
    time.sleep(60) # Check every 60 seconds
    ^^^^^^^^^^^^^
```

Outcome

- ❑ **Monitor Web Application Health:** Periodically send HTTP requests to your application to verify if it is up and running.
- ❑ **Automated Alerts:** Automatically send email alerts whenever the application is down or unreachable, ensuring quick response time.
- ❑ **Error Handling:** Implement error handling to detect and respond to network issues, timeout errors, and non-200 HTTP responses.
- ❑ **Script Automation:** Run the script in an automated manner (every 60 seconds or as configured) to continuously monitor the application's availability.
- ❑ **Reliability and Maintenance:** Improve application reliability by ensuring it's monitored in real-time and receive alerts on downtime or issues that need attention.
- ❑ **Email Notification System:** Implement an email notification system using **SMTP** to ensure that administrators or relevant personnel are promptly informed of application downtime.