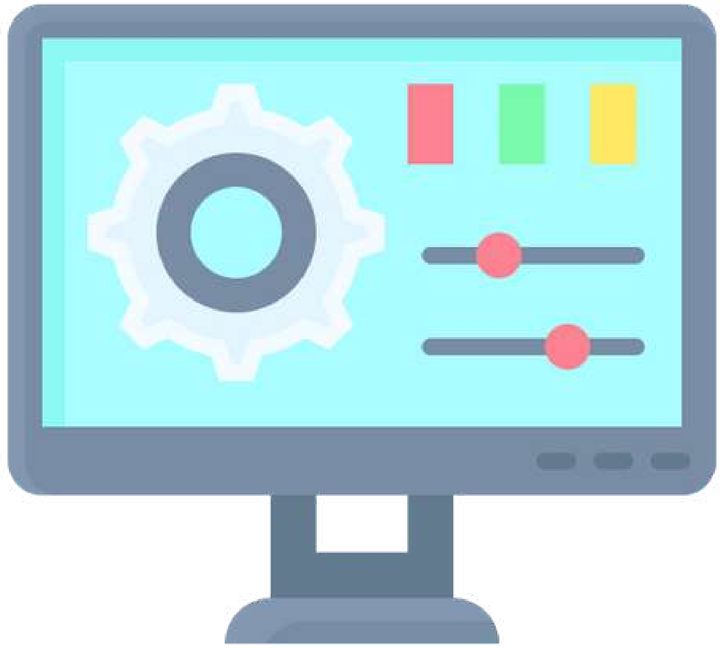
CSA0491 -Operating Systems for Process Scheduling

System Resource Monitor



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ABSTRACT

As operating systems continue to evolve, the efficient management of system resources becomes increasingly critical. The System Resource Monitor (SRM) serves as a fundamental component in this endeavor, providing real-time monitoring and management of CPU, memory, disk, and network usage. This paper explores the architecture, functionalities, and importance of SRM in ensuring optimal system performance and stability. Through various monitoring techniques and algorithms, SRM facilitates resource allocation, scheduling, and troubleshooting, thereby enhancing overall system efficiency and reliability.

Keywords : System Resource Monitor, Real-time monitoring, Network usage, Monitoring techniques.

INTRODUCTION

- In the realm of operating systems, managing system resources efficiently is paramount for optimal performance and stability. A System Resource Monitor serves as the vigilant guardian, constantly observing and analyzing the allocation and utilization of CPU, memory, disk, and network resources.
- By providing real-time insights into resource usage patterns, the System Resource Monitor empowers users and administrators to make informed decisions, preemptively identify bottlenecks, and troubleshoot performance issues effectively. Its role extends beyond mere observation; it actively facilitates resource allocation adjustments, ensuring equitable distribution and preventing resource contention.

Computational Requirements

01

Python:

- Make sure you have Python installed on your system. You can download it from the official Python website.

02

Required Python Libraries:

- psutil
- matlablib
- pandas

03

System Compatibility:

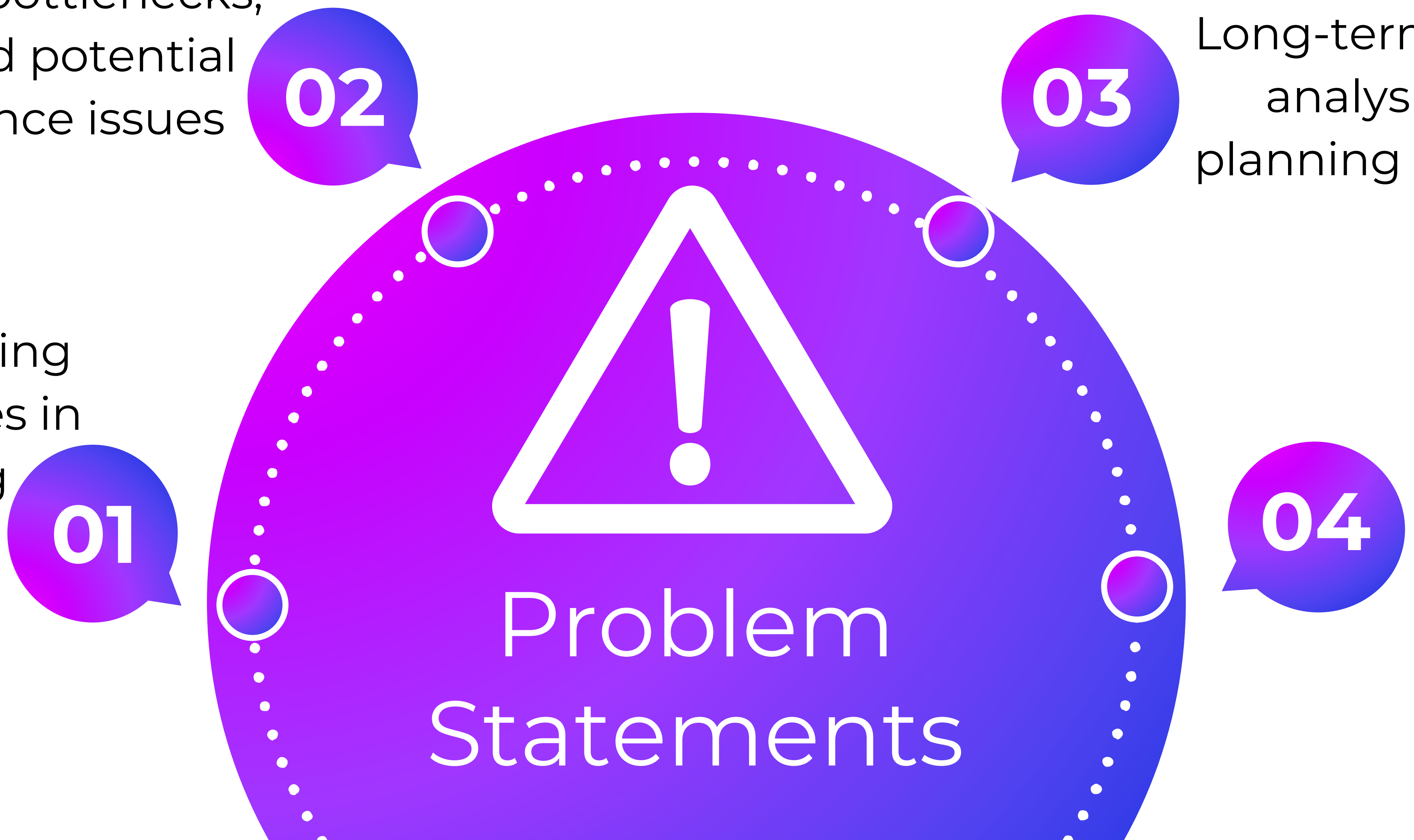
- The code is designed to be cross-platform and should work on Windows, macOS, and Linux systems.

04

Sufficient Resources:

- Ensure that your system has sufficient resources (CPU, memory, disk space) to run the monitoring script, the code is designed to run in even low end PCs.

Problem Statements



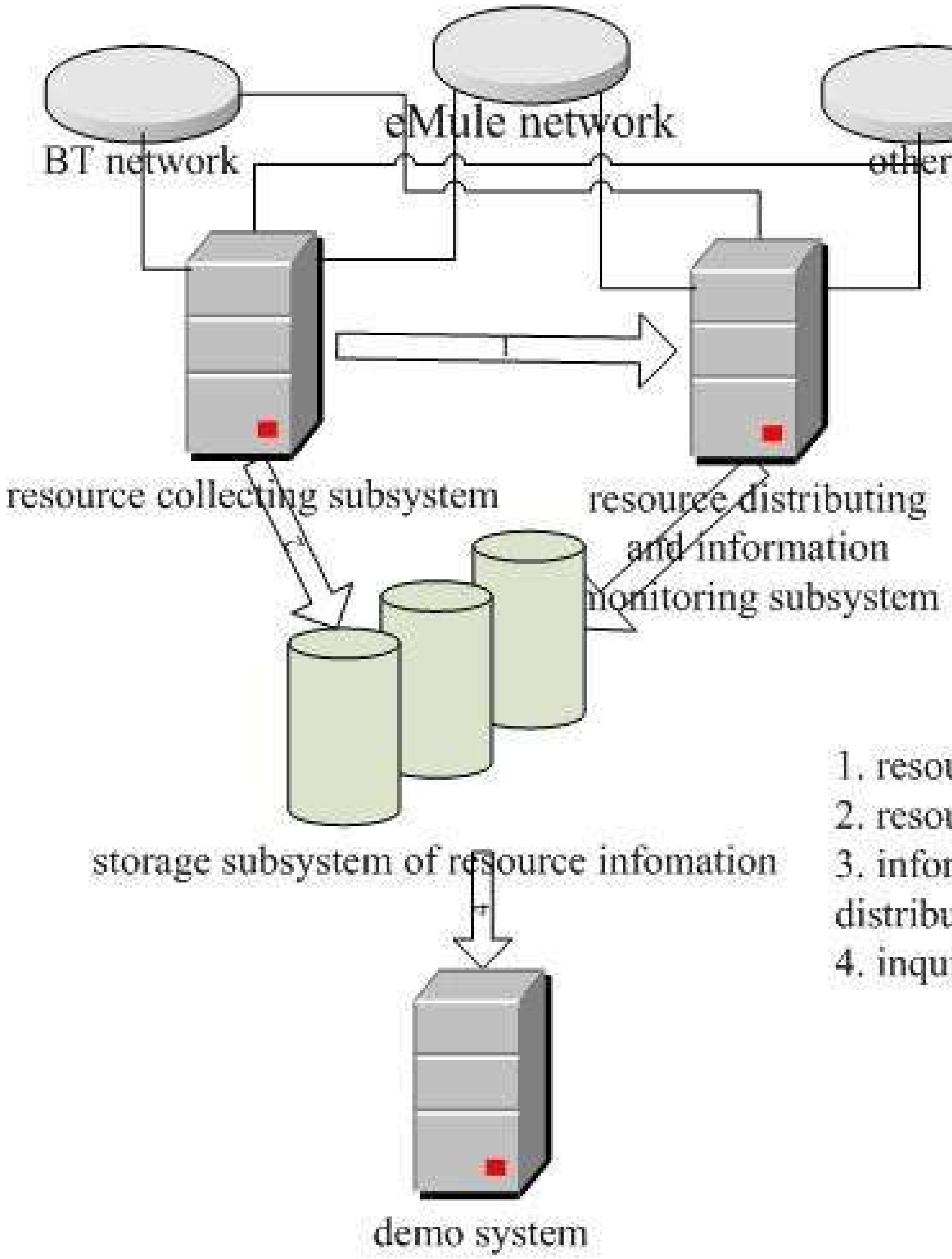
01 Managing and optimizing critical system resources in dynamic computing environments.

02 Need for real-time insights to identify bottlenecks, spikes, and potential performance issues

03 Long-term resource trends analysis for proactive planning and optimization.

04 Complexity of modern computing demands user-friendly tools.

Architecture


BT network
eMule network
others
resource collecting subsystem
resource distributing and information monitoring subsystem
storage subsystem of resource infomation
demo system

1. resource and its description
2. resource and its description
3. information of resource distribution (Peer List)
4. inquiry data

Project Objective

Real-Time Monitoring:
Use system-level APIs for continuous data collection.
Capture instant data on CPU, memory, I/O, and bandwidth.
Process data for real-time analysis.

Data Logging and Analysis:
Log real-time data for trend analysis.
Retrieve historical data for insights.
Understand long-term resource patterns.

Graphical Representation:
Create visuals for resource trends.
Enhance user understanding.
Use charts for complex metrics.

Export and Reporting:
Export historical data for analysis.
Generate detailed reports.
Support documentation and decisions.
User Interaction:

User-friendly interface.
Allow customization of alert settings.
Ensure accessibility for all users.
Proactive Measures:

Act on real-time and historical data.
Address issues before impact.
Foster strategic system optimization.

Output

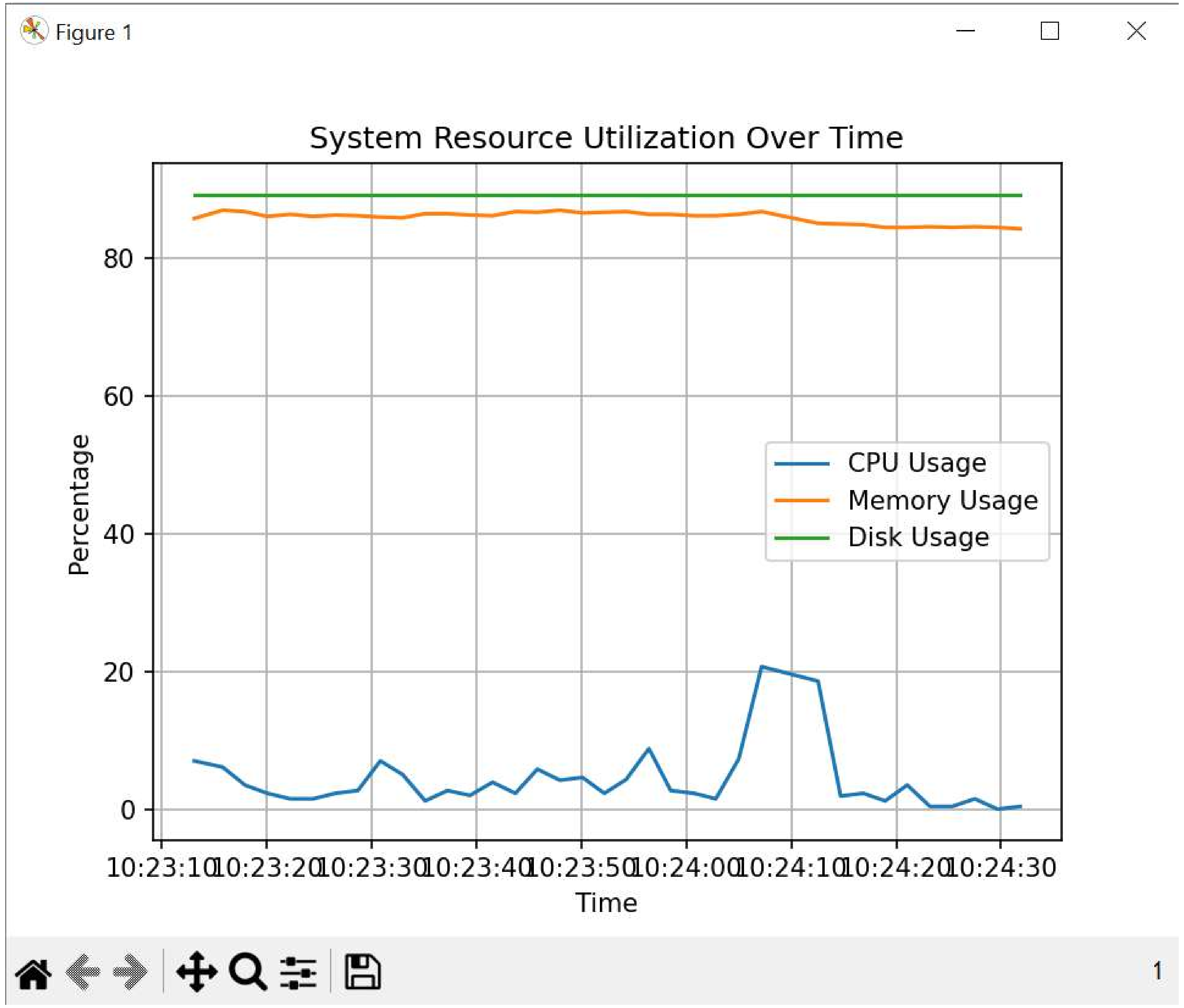


Figure 1
System Resource Utilization Over Time
Percentage
0
20
40
60
80
10:23:10
10:23:20
10:23:30
10:23:40
10:23:50
10:24:00
10:24:10
10:24:20
10:24:30
Time
CPU Usage
Memory Usage
Disk Usage
1

Thank You!

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