ASIPP

The Network Monitoring System Based on Cacti for EAST

## C.C. Li[1,2], Z.S. Ji, F. Wang, P. Wang, Y. Wang, Z.C. Zhang

[1]Institute of Plasma Physics, Chinese Academy of Sciences, Hefei, Anhui, China

licc@ipp.ac.cn, jizh@ipp.ac.cn, wangfeng@ipp.ac.cn, wangping@ipp.ac.cn, wayong@ipp.ac.cn, zzc@ipp.ac.cn

[2]University of Science and Technology of China, Hefei, Anhui, China

EAST

ABSTRACT : During the smooth running of EAST (Experimental Advanced Superconducting Tokamak), a perfect network management system guaranteeing a robust network is important. In the present complex network infrastructure, it is a daunting task to manage all the devices manually in a network and make sure they are not only up and running but also performing optimally. Therefore, a web-based software system is developed to implement the real-time monitoring of the EAST experimental network in this paper. Written by the language of PHP, the system based on Cacti uses the RRDTool (Round-robin database tool) engine to store data, stores the systems configuration information by MySQL, and collects periodical data through Net-SNMP. It has realized data acquisition, network weathermap, fault alarm, user management and other modules. Compared with the previous management way, our system can dynamically monitor the network link state, bandwidth usage, the information of network devices load in real time, and give the real monitoring effect; it can also find the various faults and give alarm by sending text messages and emails respectively, so that we can take appropriate measures to resolve them in time. Compared to Email alarm, SMS (Short Message Service) based on the hardware of GSM Modem has the advantages of faster speed and more reliable communication signal. So far, the monitoring system has been successfully applied in the network of EAST and greatly improved the efficiency of network management.

Introduction
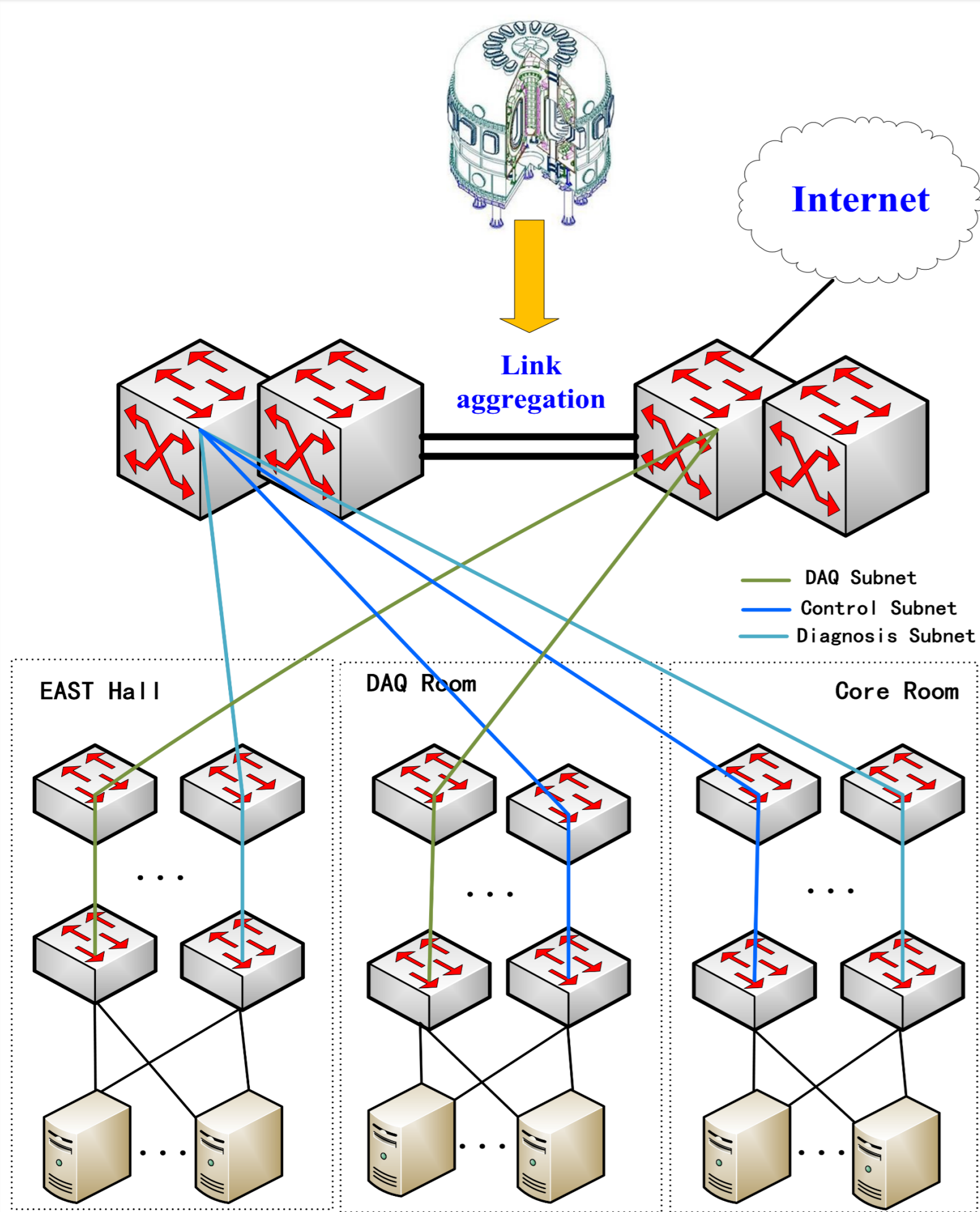
1. As a large fusion reaction device, EAST consists of a large number of subsystems being operated in distinct hardware and software environment. These heterogeneous tokamak subsystems should be communicated with each other in a stable manner to ensure EAST's reliable running.

2. The following situations that a power supply burns out, some devices stop working, network bandwidth is out of the threshold value and so on, are out of control and we don't know when these things will happen.

3. Therefore, we develop a network monitoring system based on Cacti for EAST. This system is not only helpful to deal with the above mentioned situations and minimize down-time, but also helpful to collect the relevant information about the network. So we can optimize and improve the network performance better and maintain a more robust network.

4. Some technologies and realization methods of establishing network monitoring system for EAST are presented in this paper.

Cacti Basic Framework
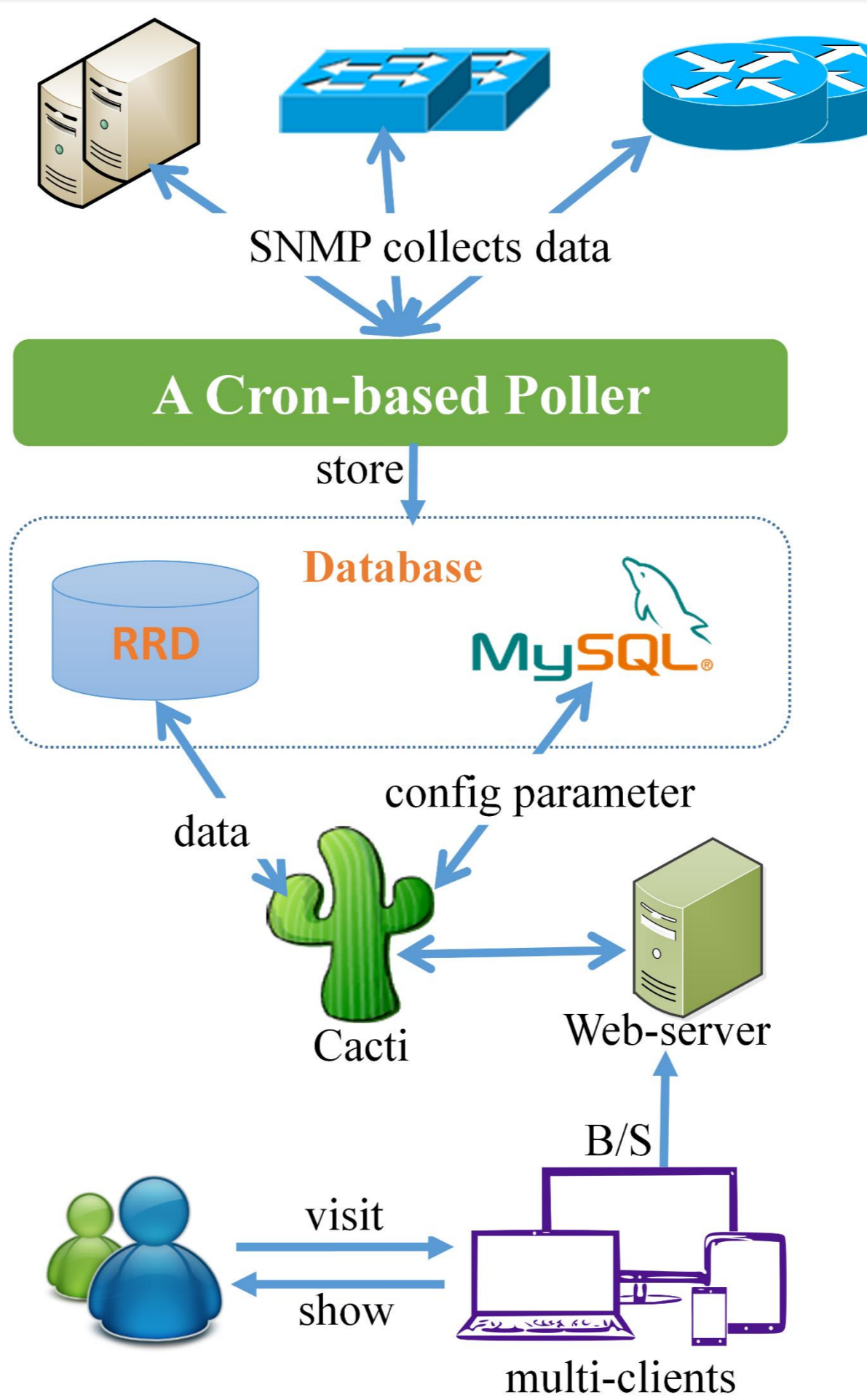
1. SNMP service gathers data from different network-attached devices (e.g. servers, switches, routers) in each interval decided by a cron-based poller.

2. RRD(Round Robin Database) stores the polled data in an efficient and systematic manner and generates graphical representations of the data values.

3. MySQL stores the main configuration information(e.g. setting, user and display-related) for any Cacti installation and the devices, graphs information we defined.

4. The primary user interface is a PHP web application. Managers can visit it by multi-clients, such as smart phone, iPad, laptop, desktop computer, and perform a series of management operations.

SMS Alarm Realization

The alarm message of Cacti

Hardware of SMS
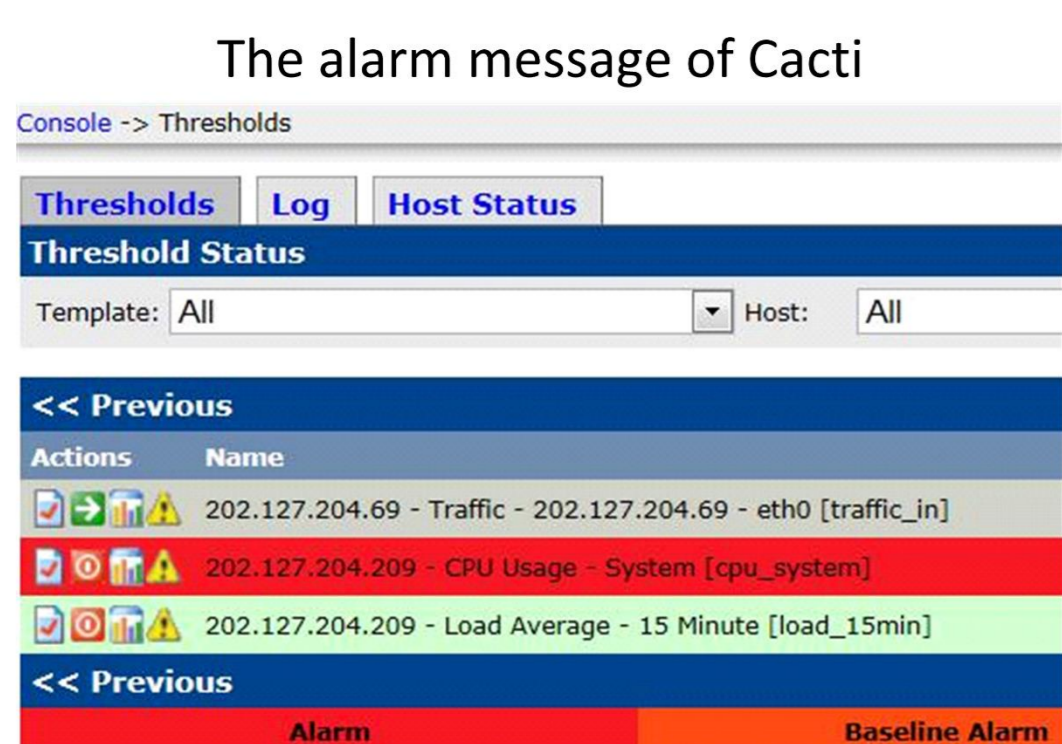
Implementation Process

1. Write the alarm message of Cacti into MSSQL.

2. The polling algorithm is still scanning MSSQL and check if it has a new message.

3. If there is a new message, polling algorithm triggers GSM modem work at once and the hardware sends the message to the manager.
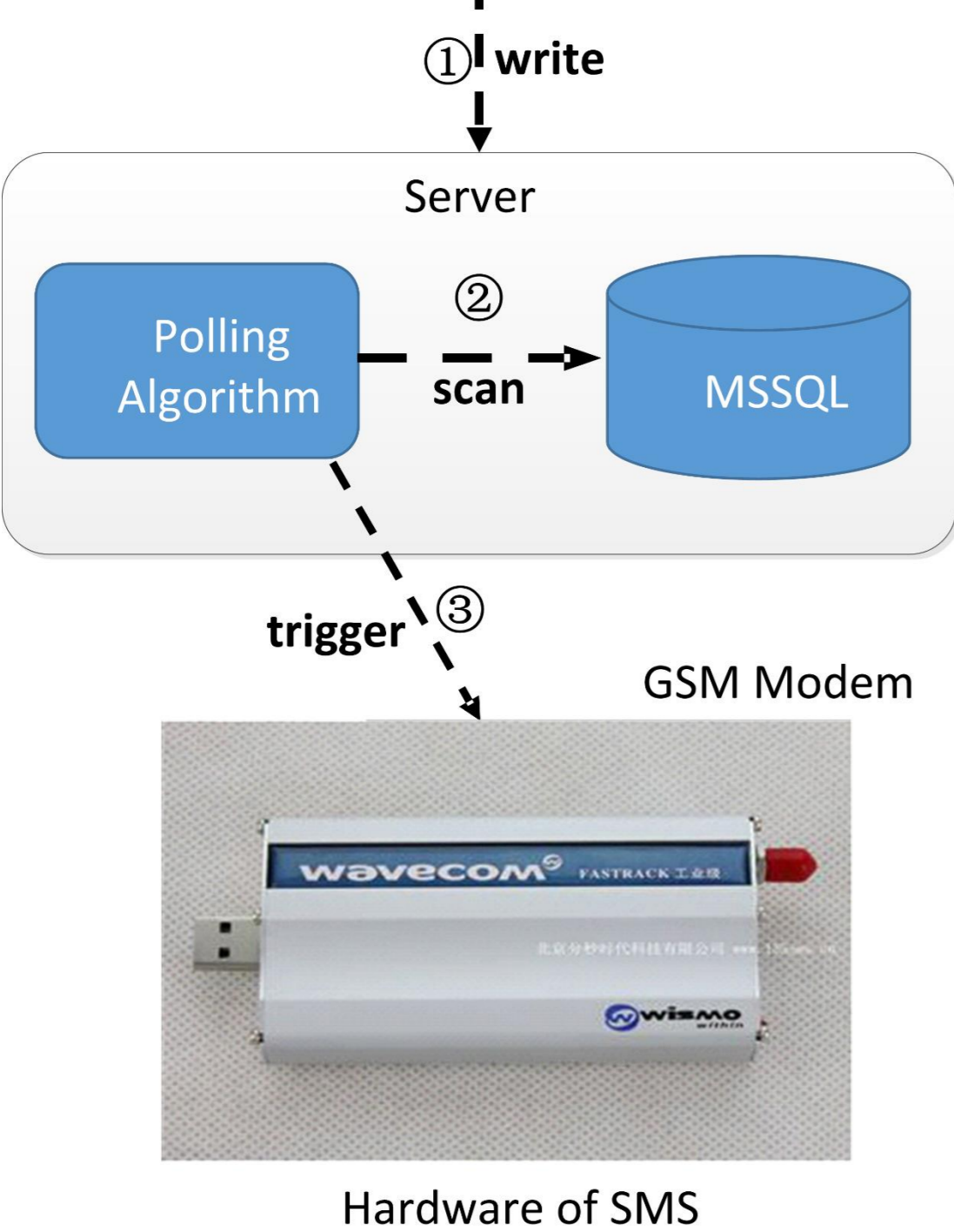
Test Results

1. Display the alarm information about the overflow and recovery of network traffic of the monitored device .

2. Email alarm is aimed to help us to analyze better the reason of the fault according to the description and the graph.

3. SMS alarm pays more attention to the speed and reliability of message received.

4. Compared to Email alarm, SMS provides much more timeliness and convenience.

Functions Display

Cacti Functions

Graph
Shows the performance of devices

Monitor
Shows the status of all devices

Weathermap
Show the current network traffic

Thold
Notify us of the alarm informantion

Conclusion

➢ This system realizes multi functions such as device performance management, fault monitoring and the display of current network state.

➢ The system let us be able to prepare for the faults in advance, which greatly improve our work efficiency.

➢ By using this system, we can maintain a robust EAST experimental network and even optimize the performance of our network.

Acknowledgement