

MAGGIE

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WHAT IS MAGGIE?

MAGGIE is a collaborative research initiative by the Stanford Linear Accelerator Center (SLAC) USA and NUST Institute of Information Technology (NIIT) Pakistan. It involves students and professionals from both sides working on various development and research issues related to network monitoring.




SLAC

WHAT IS PINGER?

Pinger (Ping End-to-end Reporting) is the name given to the Internet End-to-end Performance Measurement (IEPM) project to monitor end-to-end performance of Internet links. The project now involves hundreds of sites in many countries all over the world

ACHIEVEMENTS IN 2006—RESEARCH PROJECTS

Team MAGGIE successfully concluded six research projects in the year 2006. Significant developments in four other research efforts were made as well. Few of these are listed below:

1. **TULIP:** TULIP's purpose is to geolocate a specified target host (identified by IP name or address) using ping RTT delay measurements to the target from reference landmark hosts whose positions are well known.
2. **ViPER:** ViPER's purpose is to visually present the location of all the Pinger nodes on the world map, show links between Pinger Monitoring and Remote nodes and provide visual representation of all the data monitored by Pinger.
3. **Network Weather Forecasting:** To forecast network performance parameters with reasonable confidence using statistical techniques such as Auto-Regression and Moving Average (ARMA). 
4. **Network Topology Discovery and Visualization:** To facilitate the identification of network performance parameters, monitoring, event detection and visualization. In particular, Path-Neck (an opensource tool developed jointly by AT&T and CMU) has been identified as a tool that we wish to implement and extract information from.
5. **Federation; SmokePing-Pinger Integration:** To build a federation of measurement infrastructures so that latency measurements (historical and recent) can be shared, best practices among several measurement infrastructures can be adopted.
6. **Network Event Detection and Diagnosis:** To identify abnormalities in the network behavior and determine the cause.
7. Apart from these efforts several other endeavours such as **Network Anomaly Detection, Pinger Executive Plots, Pinger Management, AMP-Pinger Integration** have been successfully executed.

RESEARCH PUBLICATIONS

Team MAGGIE published the following papers in the year 2006.

1. Rehmatullah, A. Cottrell, L. Ali, A. et. al. "Quantifying the Digital Divide: A Scientific Overview of the Connectivity of South Asian and African Countries" *In Proc. of CHEP 2006*.
2. Saqib, F. Manzoor, S. Kalim, U. Ali, A. "Network Weather Forecasting in Grid Systems", *In Proc. of HONET 2006*.
3. Khan, S. Ali, A. Cottrell, L. Kalim, U. "Grid Monitoring on Handheld Devices", *In Proc. of HONET 2006*.
4. Nazir, F. Ali, A. et. al. "An Efficient Approach Towards IP Network Topology Discovery for Large Multi-Subnet Networks", *In Proc. of 11th IEEE Symposium on Computers and Communication, 2006*.
5. Khan, A. Ali, A. "MoMon: Single Ended, Plug-and-Play, and Autonomous Grid Network Monitoring Tool", Submitted for publication *In Proc. of GridNets 2006*.
6. Khan, S. Ali, A. Cottrell, L. Kalim, U., et. al. "Quantifying and Mapping the Digital Divide from an Internet Point of View", Submitted for publication *In Proc. of 4th International Conference on Bridging the Digital Divide – Asian Applied Computing Conference (AACC 2006)*.



NATIONAL UNIVERSITY OF SCIENCES AND TECHNOLOGY

NUST Institute of Information Technology,
166-A, St # 9, Chaklala Scheme III,
Rawalpindi, Pakistan.

Phone: +92-51-9280443
arshad.ali@niit.edu.pk

Phone: +92-51-9280658 x 134.
umar.kalim@niit.edu.pk

WE'RE ON THE WEB

MAGGIE.NIIT.EDU.PK
WWW.NIIT.EDU.PK

WHY MAGGIE?

The motivation behind MAGGIE (Measurement and Analysis of the Global Grid and Internet End-to-end performance) is the need for better and more integrated Network Performance Measurement and Monitoring, considering the increasing amount of computing and networking power in the scientific research community. Its purpose is to integrate numerous network and application performance monitoring tools into a scalable and secure infrastructure providing measurements, analysis and access to data. Most of the monitoring tools being developed, derive their data from the PingER project.

NEWS (2006)

- Mr. Asif Khan was awarded the Gold Medal for the best Final Year Project in the Department of Information Systems Engineering for the year 2006.
- UG Scholars (Mr. Shehryar Khan, Mr. Asif Khan and Ms. Fareena Saqib) represent NIIT at HONET 2006 (USA) to present their research.
- Mr. Akbar Mehdi, Mr. Shehryar Khan and Mr. Asif Khan proceed to SLAC to conduct their research activities. They are expected to contribute to the efforts at SLAC for one year.
- Two independent research proposals were prepared and submitted to Government of Pakistan and USA for research grants.
- Dr. Les Cottrell visited NIIT to streamline the research activities.

FUTURE PLANS

1. Development & Deployment of a **network monitoring infrastructure** in Pakistan taking IEPM at SLAC as a model.
2. **Extension** in the work done under the project of Event Detection and Diagnosis. This would include:
 - Integration of the modular trace analysis tools created by MAGGIE
 - Integration of Internet2 /geant data using perfSonar.
 - Extension of the analysis to include tools such as ganglia and nagios.
3. **Optimization of TULIP:** Even though the software has been developed, yet there is considerable room for improvement in enhancing the accuracy of the algorithm. We plan to mature our techniques in the coming months.
4. Development of a Visualization utility for **perfSonar** and **IEPM**.

