

20180329 PingER Team Meeting

Time & date

Thursday, March 29th 9pm Pacific time; Friday, March 30th 2018 9:00am Pakistan time; 12:00noon Malaysian & Guangzhou time; and 11am Thailand time.

Format

New items and updates are in bold face.

Coordinates of team members:

See: <http://pinger.unimas.my/pinger/contact.php>

Attendees

Invitees:

Wajahat Hussain+(SEECs); Saqib+; Johari?; Adib (maybe); Fizi Jalil (MYREN); Dr. Charnsak Srisawatsakul (maybe) (Ubru), Les+, Bebo+, Umar+

+ Confirmed attendance

- Responded but Unable to attend:

? Individual emails sent

Actual Attendees

Wajahat, Saqib, Bebo, Umar, Les.

Others

Administration

- Membership of pinger-my in <https://groups.google.com>.

Amity

- Manuscript titled - Clustering Analysis of PingER Network Data for Vardha Cyclone has been PEER REVIEWED and ACCEPTED for publication in the Confluence-2018:8th International Conference: on the theme "Cloud Computing, Data Science & Engineering" presented on 11th - 12th January 2018 at Amity University Uttar Pradesh, Noida, India.
- Their PingER MA system has crashed and they are reinstalling the project.
 - PingER MA having problems, Les is working with them. **Still working with them, inching closer. Last email 3/12/2018. Reminder 3 /26/2018. Response from Amity 3/27/2018. unable to load xml file, will update pinger2.pl at Amity so can debug.**

UM

March 22 March 2018 we started being unable to gather data from pinger.fsktm.um.edu.my (103.18.2.152).

- When one tries to ping by name it fails,
- However pinging by the IP address works:
- I thought it might be our DNS resolution, however, I also could not see it from Thailand, i.e. from http://202.28.194.4/toolkit/gui/reverse_traceroute.cgi?target=pinger.fsktm.um.edu.my&function=traceroute
- and I got the same result from a host in Pakistan <http://comsatsswl.seecs.edu.pk:8080/cgi-bin/traceroute.pl?target=pinger.fsktm.um.edu.my&function=traceroute>
- Sent mail to Nor Badril Anuar. He investigated and it came back on its own and no measurements were lost.

Bebo (No update 3/8/2018)

Looking into moving PingER to a "blockchain" database good for decentralize distribution of data. Monitoring sites would then be able to write to a distributed ledger. This would change the architecture to a more peer to peer architecture. It helps with continuity of PingER since reduces dependence on a single site (SLAC). See Block Chain in [Future PingER Projects](#). Bebo sent several references to Saqib who has looked at them. We could start with real time data without including the whole archive, i.e. in parallel to the continued centrally managed archive. It would be a private Blockchain and hence not be as compute intensive as a public blockchain. Johari is also interested and will follow up with Bebo and Saqib.

Saqib gave an outstanding presentation at Guangzhou. There were a lot of discussions. Saqib has submitted to IEEE transactions and should hear mid May if it has been accepted. The conference is in September. Saqib and Bebo will discuss the next steps. Saqib will try and find a graduate student to work on it.

Thailand

Charnsack has committed to joining the team working on comparing TCP vs Ping and IPv4 vs IPv6. Umar has sent Charnsack all the relevant information and instructions

Les is pursuing the possibility of an MoU with SLAC legal, the legal contact was on maternity leave so there was a delay. He has returned and been reminded and is looking at it. He says "The process for foreign MOUs has unfortunately gotten more complex per new DOE requirements." It can take a long time to go through the process. SLAC has not submitted any MoUs in the last 5 years. Les is still pushing forward and sent an outline to his bosses.

UUM (No input from Adib 12/7/2017, 3/8/2018)

- Adib has updated the paper on Internet Performance and its Reflection on Socioeconomic Development in the ASEAN Countries to IEEE Access and sent to Les and Bebo for review. **It has been reviewed and suggestions returned to Adib. It looks very good. Adib has re-submitted it to IEEE Access. Hopefully, we will get a positive feedback this time.**
- Adib, Bebo, Les met with Southampton Web observatory person. There seemed to be enthusiasm. Adib was going to send some materials to Southampton. The person at Southampton gave us some links. Adib is in the early stages of exploring what web observatory data to link with such as business context indicators, social media and government sites. **There is no update 3/29/2018.**

NUST: Updated 3/8/2018)

They have shortlisted candidates for the task of managing the Pakistani MAs. The students will be given a stipend. Now they are in the phase of selecting them. This involves bureaucracy so there will be a little delay. They will get new interns before summer starts, i.e. 6-8 weeks. Till then things will be little slow.

Wajahat proposes to get a list of the new Universities in Pakistan and contact them encouraging them to participate in PingER and set up MA. They have made a list of new university sites, communications networks, Labs in different regions of Pakistan (especially the remote regions) and will make contact.

There is an upcoming grant call for projects between Pakistan and the US. Topics may be focused on cybersecurity, health, and education. It has not been announced yet. Wajahat will get the details and share them with the team as soon as they are available. It is interesting since getting a US partner appears to be a roadblock for many potential Pakistani responders. However, the topics may not be very related to PingER. **NUST is looking at applying to set up a cyber lab. Getting the funding will be in competition with other Pakistani Universities.**

For cyber the main things we could think of from PingER were: quantifying what fraction of hosts block pings, punching holes in firewalls to allow pings, how to misuse ping (e.g. ping-of-death, or using anomalous ping packets to deduce the OS etc. flood pings for DOS), the host can respond to ping but applications do not work. Fear of misuse of pings can result in the system administrator, network administrator or cybersecurity blocking pings. A possibility might be a study of what fraction of say working www/dns etc. apps (i.e. checking if a host responds to the relevant port) do not respond to pings. This could be by application, by country or by region etc. Also how to protect a remote ping traceroute or server from being used in DOS attacks. As of 3/27/2018 there is no call so far. There was one last year, so Wajahat is expecting one.

We were unable to gather data from:

- 121.52.146.180 (kohat.edu.pk) down since Nov 22/2017. Wajahat recommends continuing at least until the new student is up to speed (3/8/2018). **No data available 3/24/2018.**
- cae.seecs.edu.pk last time we were able to gather any data was February 27th.
- pinger-ncp.ncp.edu.pk pings but can't gather data 8/11/2017 and 9/16/2017. Contacted. Pings but can't gather data 10/24/2017. They are in the process of restoring 1/17/2018. Still down February 28, 2018, await new student. (3/8/2018). **No data 3/24/2018.**
- pinger.isra.edu.pk unable to gather data since 3/6/2018, also does not ping.

UNIMAS (No update 3/8/2018)

- Johari ran into a problem with the Raspberry Pi image creation. Apparently, the image has to be burnt with exactly the same size as the capacity of the micro SSD, and the latter varies. There may not be a solution. **Do we give up?**
- Johari is looking at updating the PingER Malaysia website (pinger.unimas.my)
- **We have lost both MAs at UNIMAS**
 - Johari has been unable to contact Hafiz to get MyREN monitor at UNIMAS (perfsonar-unimas.myren.net.my) working again. There was a discussion between Johari and Adib. Adib confirms Hafiz is still at MYREN, MYREN are moving locations which may have an impact on some servers and availability of Hafiz. Adib will try and contact Hafiz.

UAF/GHZU (Saqib)

He has written a very nice paper on blockchain and its potential use for PingER storage, reviewed by Les and Bebo (also see above under Bebo).

~~Pinger.gzhu.edu.cn MA is down since November due to a possible security issue. Saqib recommends giving up, i.e. Disable it. **It has been disabled.**~~

IPv6 node in Beijing is still down. Hope to be restored in 2 -3 weeks (as of 3/28/2018).

Saqib has joined the team comparing icmp/ping vs TCP for both IPv4 and IPv6, Umar whas sent instructions.

PingER at SLAC

Umar looking at extending the comparison IPv6 vs IPv4 ping RTTs and TCP vs ICMP/ping RTTs. See [Towards Analysis of ICMP vs TCP Ping Latencies](#).

- Working on [Validating ICMP ping measurements against TCP nping measurements](#).
 - He has completed the measurements and analysis for SLAC, the results are zipped and take 24MBytes
 - He is re-running the data for VTech.
- He has the script setup to make the IPv4 vs IPv6 measurements
 - It ran to completion in 12 hours. There were 56 IPv6 addresses of which 14 were responding to nping
- Want MAs at:
 - SLAC and Virginia tech (Les, Umar) measurements for ping vs nping completed,
 - China (Saqib has agreed to join in),
 - Thailand (Charnsak has agreed to join in),
 - If others wish to join the paper (i.e. make the measurements - takes just over a week elapsed time, help analyze the data and put together the paper), we need to know soon.
 - Pakistan (Wajahat)?
 - Malaysia-Sarawak (Johari)?
 - Malaysia mainland (Adib)?
- Umar is concentrating on understanding why there are some significant differences. He will look at the impact of the stacks (by setting up a control environment wit the latest Linux tools, and see if the difference in the stack traversals times is significant when compared to the overall RTT differences. He is also thinking of seeing if there are common elements (e.g. hops) that can be tied to significant differences in RTT time.

XSS vulnerability in traceroute.pl

- Sent following email to Johari, Adib, Wajahat and Saqib:
 - There is a modified version of the PingER [traceroute.pl](#) CGI script. The new version sanitizes the QUERY_STRING variables to prevent some just exposed cross-site-scripting (XSS, see for example https://en.wikipedia.org/wiki/Cross-site_scripting) vulnerabilities. It is recommended that you replace the existing [traceroute.pl](#) script at your site with the new version, i.e. get (e.g. using wget) [traceroute.pl](#) from <http://www.slac.stanford.edu/comp/net/traceroute/traceroute.pl> and install in your CGI directory (often /var/www/cgi-bin or /usr/local/cgi-bin or /usr/lib/cgi-bin or /var/www/cgi-bin). You may need to make it executable with the command `chmod a+x traceroute.pl`. You can test it by loading the URL <http://yourwebserver/cgi-bin/traceroute.pl>.
 - No word, must be OK will send to list at PINGER-DEV@LISTSERV.SLAC.STANFORD.EDU

Working with Saqib to test pinger2.pl to make it work with IPv6 servers and targets

- We will need to add an item to the pingtable.pl form to enable the ability to select IPv4 or IPv6 measurements or both.

Pinger data was kept on a Sun Solaris file server front-ending a 1TByte disk array. Solaris is no longer supported at SLAC and the disk array is 13 years old so we need to migrate the data. The migration to GPFS was completed 3/29/2018 3:30pm Pacific time. It took about 1.5 hours and we lost the ability to make three sets of half-hourly measurements. It appears to be stable.

Host	State	last seen	Status
Pakistan	See above.		
pinger.gzhu.edu.cn	They have security concerns. Give up 3/26/2018..	Nov 23, 2017	
pingeramity.in	Unable to gather data, needs re-installing the MA. Working with Amity, emails Jan 12, Jan 16, Jan 26, Feb 20, Mar 28	March 22, 2017	

Next Meeting

Next meeting: Thursday, May 3rd 9pm Pacific time; Friday, May 4th, 2018 9:00am Pakistan time; 12:00noon Malaysian & Guangzhou time; and 11am Thailand time.

Old information

GZHU (moved here 3/8/2018)

Saqib submitted a project in CERNET to monitor the performance of IPv6 network using PingERv6. He received the news that the project is accepted with 100K RMB. Now he has 2 accepted projects regarding PingER and total amount he has is near about 40K USD. Further, in his lab, three U1 servers have already arrived through another grant for research purpose. We can also use them for our PingER project.

Therefore, the CERNET has given Saqib a IPv6 based CentOS 6.8 machine in cloud. Now he is trying to deploy the PingER server on the machine. Let's see how it will work on IPv6 based network. This is a 2-year project.

Saqib has made contact with John Pickard author of "Quality of IPv6 Enablement of Universities: An International Study" who has provided a list of about 125 Universities in about 60 countries hosting IPv6 sites. However many are proxies. Les has suggested using perfSONAR (there are about 1000 and they all have lat longs in the perfSONAR database. Saqib is gathering the list, then we will see how many have IPv6 addresses.

The paper title: "Missing Values Imputation in PingER Internet End-to-end Performance Measurements using k-nearest neighbors (k NN)" was not accepted in IMC 2017. He is updating the paper according to the reviewer's comments. Hopefully, Saqib will submit it at some other venue. Not yet decided on the submission venue. Need some suggestions. Updated but not decided where to submit. Update 12/4/2017?

Currently, no data is available on PingER on Android due to unavailability of the live IP address. No update 4/19/2017, 7/6/2017. Email sent to Sara Masood. No update 9/24/2017. Any update 10/24/2017. No progress 1/18/2018.

GZHU (moved here 1/15/2018)

PingER has valuable historical data for the last 20 years. Many analysis and case studies have been carried using this data. A lot of information is available on the website. Saqib's idea is to publish the brief summary all these analysis through a survey paper covering the history and utilization of PingER data starting from 1998 to 2017. Saqib started on it, Les is providing assistance. Need your feedback on the idea of Measuring the Digital Development of the Countries using PingER data. [Is there something you want me to review some, e.g. some draft document on Measuring the Digital Development of the Countries using PingER data](#), or are you asking if it is a good idea to review and create such a document. If the latter I think this is a fascinating subject. Part of the challenge is the chicken and egg problems: i.e. is it network performance influencing advancement of the country, or is it the reverse that advanced countries can afford good networks. My belief is it goes both ways. Also one needs to extend the analysis beyond just Africa else it's kind of a repeat of [Pinging Africa](#), R. Les Cottrell, IEEE Spectrum February 2013. Also see [A Simple Tool for Measuring Digital Development](#), by R. Les Cottrell, IEEE Spectrum February 2013. This is derived from SLAC-PUB-15333.

UUM (moved here 10/24/2017)

"BIND: An Indexing Strategy for Big Data Processing" that uses PingER data. Submitted and accepted by the 2017 IEEE Region 10 Conference (TENCON) that takes place in November. In Penang Malaysia

GZHU

The paper title: "Detecting Anomalies from End-to-end Internet Performance Measurements (PingER) using Cluster Based Local Outlier Factor" is submitted in ISPA 2017 (<http://trust.gzhu.edu.cn/conference/ISPA2017/>). It has been accepted as of 9/17/2017.

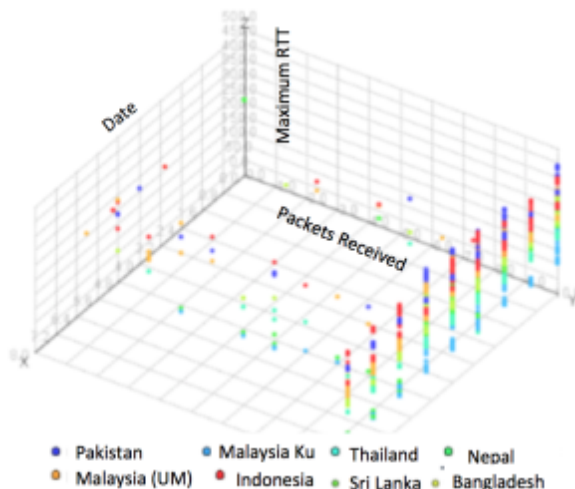
The thesis of Aqsa Hameed title "Applying Data Mining and Visualization Techniques on Pinger Data" is published in [ODBs.org](http://www.odbs.org) and is accessible through <http://www.odbs.org/2017/07/applying-data-mining-and-visualization-techniques-on-pinger-data/>

SEECs (moved here 9/19/2017.)

- Aqsa who was working with Saqib submitted "Applying Big Data Warehousing and Visualization Techniques on pingER Data", Aqsa Hameed, Dr. Saqib Ali, Dr. Les Cottrell and Bebo White, to BDSEA 2016.
- I see it is available from ACM online on the following link: <http://dl.acm.org/citation.cfm?doid=3006299.3006337> for \$15.
- This might be useful to Wajahat's student.

Amity (moved here 9/16/2017)

Preparing a paper on the impact of the cyclone Verdha that hit the Indian coast along with many countries like Thailand, Sri Lanka, Malaysia, Maldives on December 6th. They use K-Means clustering (see https://en.wikipedia.org/wiki/K-means_clustering) to identify anomalies in packets received (inverse of loss) and maximum RTT. Note that for December 7th the reduction in packets received.



Amity (moved here 5/18/2017)

From: Aayush Jain <aayush.2896@gmail.com>

Sent: 24 March 2017 12:31

To: A. Sai Sabitha; harysinha@gmail.com

Subject: PingER Android Team

Abstract for PingER on Android

Progress Made So Far

So far Shivnarayan Rajappa and Rohan Sampson's team have succeeded in making a bare-bones Android Application that can ping beacons, parse data, and generate a text file in a format specified by SLAC ready for uploading. The proposed model involved the application pulling the beacon list from SLAC's servers for pinging. However, the present application has a small percentage of the beacon list hard-coded into the application. As of now, the link between the application and proxy server has not been established.

Future Plans

The new team members are:

1. Rohit Raj
2. Shagun Seth
3. Savy Gupta
4. Aayush Jain
5. Tanuj Saraf

Owing to the advancements in Android technologies during the time of development of the project, our team believes that we can create a more capable and robust application for this project. This involves rewriting the entire application from scratch.

We also propose to create a proxy server that can act as an intermediary between the Android application and SLAC's servers. The proxy server would thus allow handling multiple hosts for greater data collection.

Approach

Our team plans to start off by completing the work on the Android app within 20 days. We will recreate the entire app, with an improved workflow for greater stability. The app will parse the beacon list from SLAC's servers and save as an XML on the device. The data generated after every ping will be appended to a file after cleaning it up with RegEx matches. We first plan to test the app with only a few members of the ping list (which will later be expanded to auto-update in its entirety).

Once we accomplish our work with the app, we will move on to the task of establishing a proxy server. Our entire team will focus on the components of networking, host management, host authentication, file synchronization, and security.

By the end of the project, the server will be able to handle multiple hosts which would all forward it data, and it would in turn reorganise it again for SLAC's servers to pull.

Amity (moved here 4/13/2017)

- The paper on Implementation of PingER on Android has been accepted by IEEE Section. The paper to be online will take 5 months.
- Students are very interested in working with different projects. They have divided the students into three batches (each batch has min of 4 students). The projects currently they are working are:
 - android,
 - data analysis(vardha cyclone)
 - and bigdata

Amity (moved here 3/12/2017)

The students successfully presented the paper on the PingER implementation on Android.at the confluence 2017 conference.. The paper is submitted to IEEE section.

Tropical cyclone Vardah hit Chennai in India on the Dec 13th. It impacted the Internet, in particular one of Airtel's undersea cables. Les sent email to A. Sai Sabitha to see if PingER from Amity could see any effect.

- During the next 6 months their research will study the impact Vardha cyclone that hit the Indian coast(South India/Chennai) and a few other neighboring countries in December 2016 as seen by PingER.
 - The idea is to study and analyze the PingER data during the corresponding time frame and deduce significant trends and patterns from the data using
 - 1. Clustering techniques
 - 2. Time series
 - 3. Correlation and Regression concepts

Amity - Java approach (A. Sai Sabitha and Shivnarayan Rajappa)

1. They are using the native java tools, they are not running the pinger2.pl <<http://pinger2.pl>> script on android since the native java tools have the following advantages
 - a. easier for user,
 - b. no need for prior installation of any software, e.g. load perl interpreter which may require missing skills, especially for a non technical user
 - c. doesn't need a rooted phone
 - d. only the apk needs to be installed to run
2. They have fixed the final sequence number change by using regex, and pushed these changes to github repository.
3. They have installed apache tomcat in the server and plan to use a java file on the server which would connect to the phones that send the request. This java file will then take the input stream received from the phone and write the output stream to a file that would be stored on the server. We are facing some problems regarding a blocked port that is not allowing the phone to connect to the server we are currently working on resolving the issue.
4. SLAC can then regularly pull these files which would be stored based on the month they are received.
5. The Android students have started writing a paper on " implementation of pinger on android " .
6. Next steps:
 - a. Extend the target list by getting the Beacon list from SLAC. It is at <http://www-iepm.slac.stanford.edu/pinger/pinger.xml> on a regular basis and updating the <BeaconList> section at their site. This was part of pinger2.pl.
 - b. Also they will need a utility to clean out old recorded data (say older than 3 months), since it will be gathered from SLAC (via the proxy) and eventually they may run out memory on the Android.

Discussion

To a large extent it depends on how we plan to use this.

- If the phones are just MAs in a fixed location then simply porting pinger2.pl is easier and probably sufficient.
- If this is intended to grow into a mobile application for general use then it needs to be the Java implementation.

A next step is to get the data from the phone MA to the archive at SLAC. The current method ping_data.pl requires a public IP address for the phone which may not exist if it is mobile. Getting the MA to put the data to the archive may raise some security issue for the archiver.

Need your feedback on the idea of Measuring the Digital Development of the Countries using PingER data

Two days ago we started being unable to gather data from pinger.fsktm.um.edu.my (103.18.2.152). When one tries ping it fails,

```
ping pinger.fsktm.um.edu.my
```

```
ping: unknown host pinger.fsktm.um.edu.my
```

```
Exit 2
```

However pinging the IP address works:

```
117cottrell@rhel6-64i:~$ping 103.18.2.152 from http://202.28.194.4/toolkit/gui/reverse_traceroute.cgi?target=pinger.fsktm.um.edu.my&function=traceroute
```

```
PING 103.18.2.152 (103.18.2.152) 56(84) bytes of data.
```

```
64 bytes from 103.18.2.152: icmp_seq=1 ttl=48 time=265 ms
```

```
64 bytes from 103.18.2.152: icmp_seq=2 ttl=48 time=266 ms
```

```
64 bytes from 103.18.2.152: icmp_seq=3 ttl=48 time=265 ms
```

```
64 bytes from 103.18.2.152: icmp_seq=4 ttl=48 time=265 ms
```

```
^C
```

```
--- 103.18.2.152 ping statistics ---
```

```
4 packets transmitted, 4 received, 0% packet loss, time 3277ms
```

I thought it might be our DNS resolution, however I also cannot see it from Thailand, i.e. from

http://202.28.194.4/toolkit/gui/reverse_traceroute.cgi?target=pinger.fsktm.um.edu.my&function=traceroute

It gives

Can't find IPv4 address for host name pinger.fsktm.um.edu.my. Probably an unknown host.

I get the same result from a host in Pakistan <http://comsatsswl.seecs.edu.pk:8080/cgi-bin/traceroute.pl?target=pinger.fsktm.um.edu.my&function=traceroute>