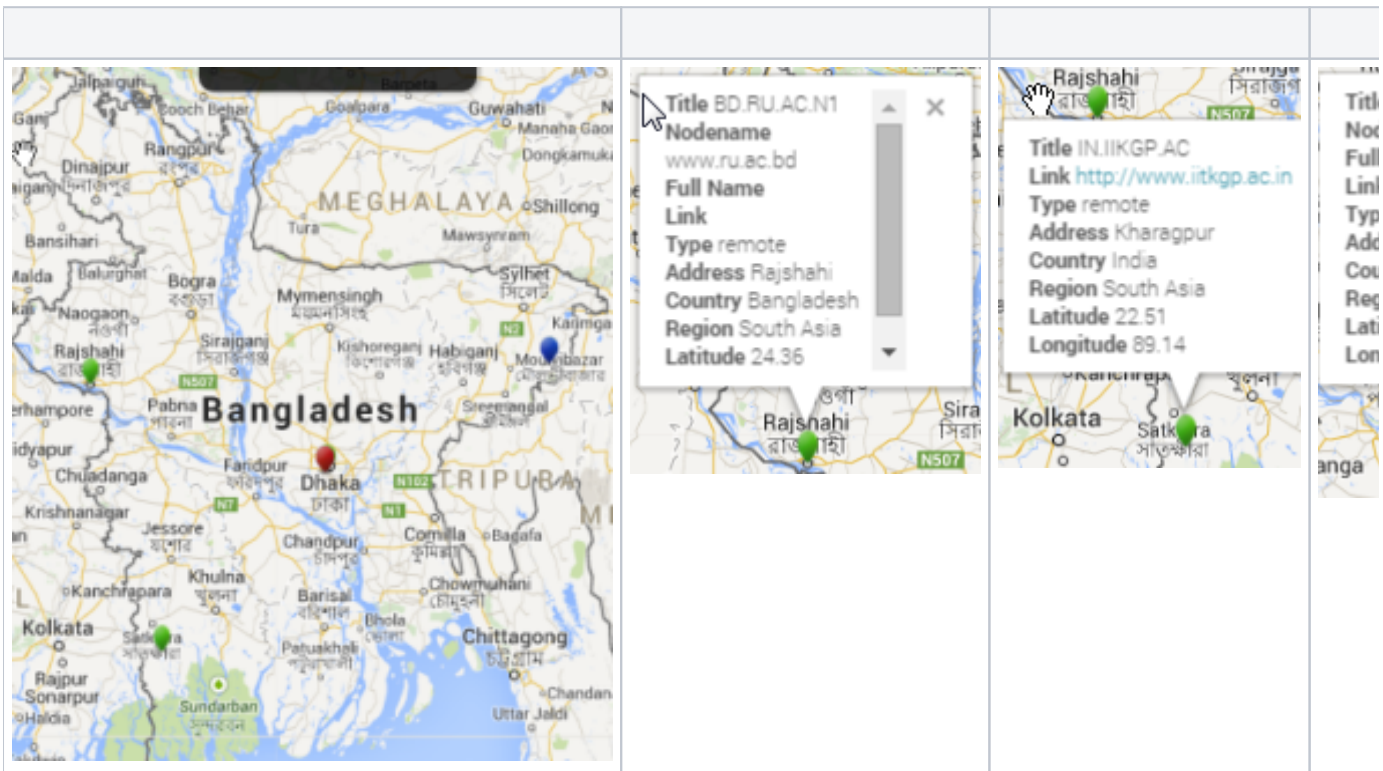


Bangladesh case study November 2014

Bangladesh PingER sites

SLAC monitors 4 sites in Bangladesh. They are seen below in the map.



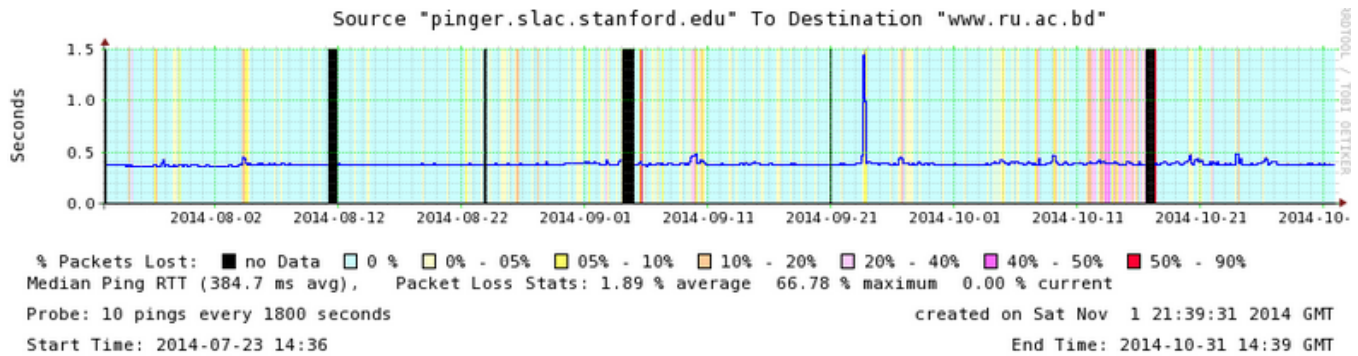
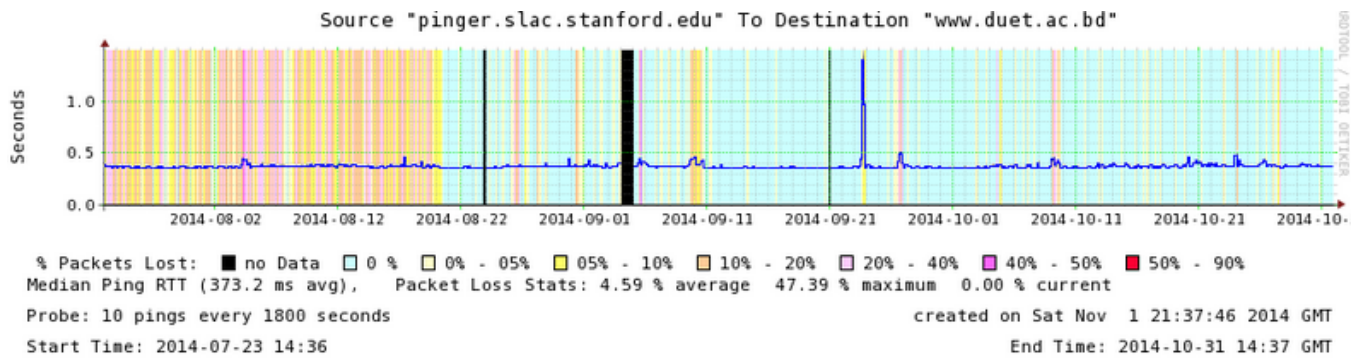
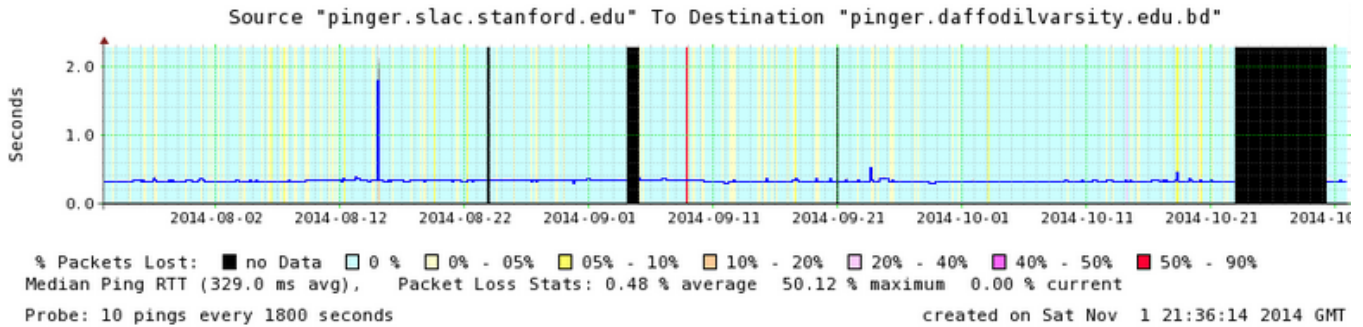
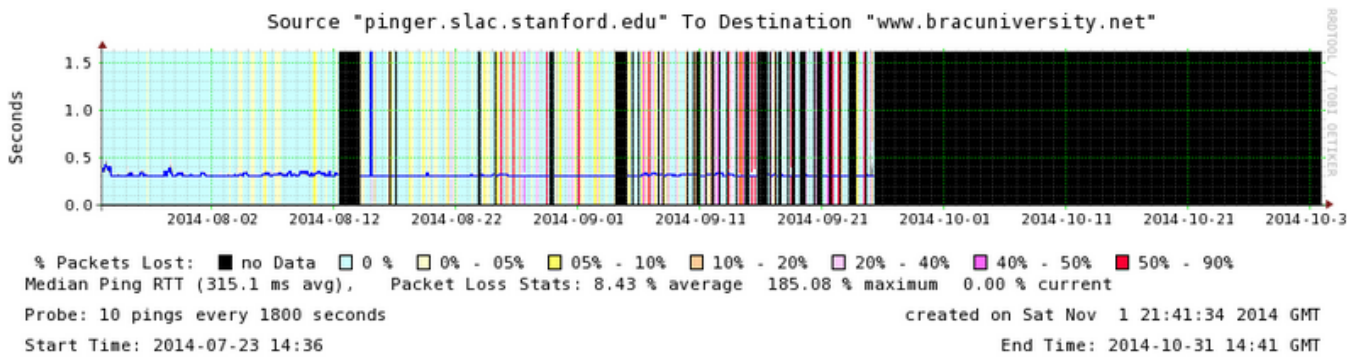
Summary

- Connections between Pakistan and the two representative hosts (Beacons) in Bangladesh are very indirect going via Europe.
- The 4 Bangladesh hosts monitored from SLAC are not exhibiting diurnal changes or jitter that would be indicative of congestion.
- In general the Internet performance from Bangladesh to other regions of the world, is similar to Pakistan's.
- One of the 4 sites (Brac University) in Bangladesh monitored from SLAC is not responding.
- VoIP should work acceptably well between Daffodil International University and most sites in Europe, Middle East, N. America, Russia and S. E. Asia.
- It appears Bangladesh switched over from using geo stationary satellite connections to terrestrial connection to the US in 2005-2006.

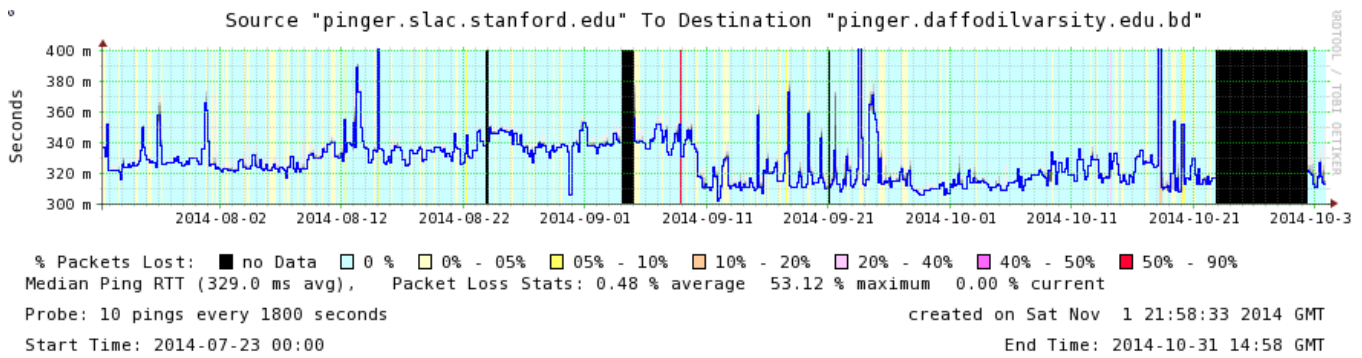
Bangladesh sites seen from SLAC

The ping Round Trip Times (RTTs) are seen below. We observe:

- The black bar (no data or host unreachable - 100% packet loss) observed 2014-09-05 in all plots is due to the host at SLAC being down and not making the measurements.
- The median RTTs seen from SLAC are relatively consistent from site to site and around 350ms.
- The lack of regular day vs night variations in the RTTs suggest that the links are not congested.
- The RTTs for each site are also relatively consistent (little jitter) with few large RTTs.
- Daffodil International University appears to have the lowest loss rates. i.e background color is usually cyan meaning no loss
- BRAC university was experiencing a lot of unreachability (black) and was no longer reachable towards the end of September.
- DUET experienced a lot of packet loss (note yellow and orange backgrounds) until mid August 2014.
- RU had a burst of lossiness (magenta background) between Oct 12 and Oct 15 2014.
- The spike in RTT seen 2014-09-24 indicates a possible common cause (ie. a link shared between all sites)



More detail for the Daffodil site are seen below:



Traceroutes from SLAC

The route from SLAC to Daffodil International University goes from SLAC to Palo Alto (3 miles away), to New York, London, Paris, Mumbai and Bangladesh.

The route to BRAC is similar.

The routes from SLAC to DUET and RU goes from SLAC and the San Francisco Bay Area to Dallas, Palermo Italy and thence to Bangladesh

Regions of the world seen from Daffodil International University Bangladesh

The column labeled BD below are the measurements of the various metrics made to other regions of the world from Daffodil International University for October 2014. Information on the meanings of the metrics can be found in the tutorial at <http://www.slac.stanford.edu/comp/net/wan-mon/tutorial.html>.

Derived TCP throughput

$$\text{Derived_throughput} = \text{MSS} / (\text{RTT} * \text{sqrt}(\text{loss}))$$

where MSS = Maximum Segment Size typically = 1460Bytes.

WORLD, Δ V	BD, Δ V	BF, Δ V	BR, Δ V	CA, Δ V	CH, Δ V	CN, Δ V	DE, Δ V	DZ, Δ V	EDU, Δ V	GOV, Δ V	IN, Δ V	IT, Δ V	JO, Δ V	JP, Δ V	LK, Δ V	MY, Δ V	NET, Δ V	ORG, Δ V	PK, Δ V	SU, Δ V	TW, Δ V	ZA, Δ V	Available	Average
Africa	209.04	92.86	601.41	607.31	1962.00	482.30	1434.68	919.18	816.17	1015.14		1635.91	1139.11	666.76	868.60	511.40	815.06	845.68	714.50	506.49	589.01	5284.11	21	1261.41
Balkans	1297.78	128.40	1131.64	1629.41	8600.90	1161.13	7754.24	1119.54	1593.74	2400.85		18245.25	3007.35	1081.75	1666.73	870.99	1659.84	1842.09	1406.16	2511.59	989.50	1331.10	21	2924.65
Central Asia	611.09	82.40	627.02	923.09	1796.35	1053.76	1764.92	351.07	801.63	1128.18		1951.67	1122.25	851.10	789.17	847.95	1010.10	1329.90	687.47		1437.89		19	1032.89
East Asia	994.33	65.26	813.25	1516.05	1400.98	717950.92	1253.94	426.40	1743.83	1578.17		1307.95	791.05	2012.00	1416.81	2189.45	1336.98	1918.94	635.43	1354.27	22429.40	676294	21	36701.41
Europe	1214.12	115.66	1175.60	2196.82	101397.94	1467.09	10766.56	1146.91	1768.69	2569.27		12702.50	2862.67	1136.65	1607.76	876.11	1398.25	1805.45	1328.76	2680.72	1055.52	1428.64	21	7271.51
Latin America	379.84	76.41	6855.71	1626.18	1507.33	826.41	1392.28	460.65	1829.61	2539.79		1425.06	1040.92	1023.02	791.36	620.67	1919.52	1626.47	635.78		990.92	618.21	20	1419.31
Middle East	1058.19	108.27	920.27	1302.01	4134.61	891.95	3601.71	840.49	1182.76	1739.01		3891.79	2016.39	847.91	1313.04	763.89	1349.22	1245.32	1068.75		708.14		19	1536.14
North America	840.72	95.36	1708.83	7848.50	2462.14	1312.12	2708.20	394.52	53261.34	11178.29		2357.93	1703.82	1881.22	880.84	791.79	11034.21	5710.75	806.36	1270.04	1453.65	918.32	21	5277.95
Oceania	863.16	62.09	892.34	2028.31	1057.46	1062.95	1025.85	338.32	1918.37	1462.17		1091.90	831.37	204.99	1736.17	2049.61	1942.64	1611.15	734.10		899.10		19	1185.54
Russia	992.57	100.81	996.36	1460.68	2302.63	1150.25	2609.99	895.64	1150.09	1347.43		2379.64	2039.19	235.29	2904.89	633.63	1063.54	1503.62	1032.20		1601.66		19	1321.83
S.E. Asia	1359.49	63.17	488.21	841.72	934.28	2577.74	824.87	376.23	1114.82	886.47		839.86	677.37	2281.33	1594.73	7907.84	926.71	1061.57	650.09		2705.40		19	1479.56
South Asia	50462.11	82.03	423.21	666.93	1391.68	1061.65	1237.19	306.35	801.34	733.61		1204.91	785.89	1319.24	494984.93	1121.89	706.25	950.47	61328.39		741.04		19	32659.02
Monitor=>	BD	BF	BR	CA	CH	CN	DE	DZ	EDU	GOV	IN	IT	JO	JP	LK	MY	NET	ORG	PK	SU	TW	ZA	Available	Average

Average RTT

This mainly a function of the route length between the source and destination.

WORLD, Δ V	BD, Δ V	BF, Δ V	BR, Δ V	CA, Δ V	CH, Δ V	CN, Δ V	DE, Δ V	DZ, Δ V	EDU, Δ V	GOV, Δ V	IT, Δ V	JO, Δ V	JP, Δ V	LK, Δ V	MY, Δ V	NET, Δ V	ORG, Δ V	PK, Δ V	SU, Δ V	TW, Δ V	ZA, Δ V	Available	Average
Africa	344.55	311.18	418.96	321.21	197.89	279.68	226.14	348.96	335.83	283.54	213.91	260.14	449.98	349.44	453.68	330.07	394.91	334.16	170.50	466.31	256.39	21	339.26
Balkans	220.06	380.37	272.33	185.24	43.67	271.09	52.29	174.77	201.59	135.85	40.33	109.53	318.31	199.07	293.05	193.87	187.52	193.94	132.13	338.86	259.70	21	200.17
Central Asia	322.97	489.60	344.63	231.20	150.84	291.87	135.33	289.17	265.69	204.70	137.51	197.55	372.59	296.77	321.45	241.49	264.90	297.84		300.39		19	271.39
East Asia	327.89	536.83	354.28	187.65	251.99	85.61	274.90	489.09	163.37	216.56	267.48	360.55	87.88	242.83	128.52	179.39	157.76	376.15	170.92	72.87	458.88	21	259.76
Europe	240.96	380.16	254.89	159.21	33.28	227.74	40.76	182.98	185.31	129.11	40.44	108.10	293.60	205.12	274.03	158.53	193.91	204.91	116.91	324.00	238.19	21	190.10
Latin America	386.25	536.89	178.03	173.50	219.94	333.48	230.65	365.87	180.04	131.21	223.43	260.26	283.87	366.64	360.46	163.29	193.17	364.60		324.14	400.67	20	283.77
Middle East	248.85	192.18	286.79	207.81	73.33	302.44	84.57	220.19	245.44	157.22	80.61	141.27	324.21	236.76	314.54	212.51	240.43	225.31		371.39		19	230.83
North America	299.55	469.83	201.64	61.63	146.21	207.95	140.92	285.39	59.84	49.37	158.21	182.01	170.17	337.58	255.65	37.81	85.64	299.08	221.24	202.37	355.91	21	201.32
Oceania	344.29	638.40	365.69	173.47	314.54	325.30	325.33	477.10	209.43	242.42	313.44	386.38	310.40	206.83	156.18	187.20	190.93	357.32		316.00		19	308.24
Russia	279.34	516.86	316.72	211.46	190.35	272.55	134.02	229.77	254.17	313.37	141.34	148.89	293.69	287.15	351.27	294.85	215.19	245.05		226.01		19	253.79
S.E. Asia	200.51	519.84	419.42	243.11	292.16	98.86	310.99	437.68	230.71	286.33	306.54	385.25	112.86	186.55	74.89	232.87	209.85	324.47		115.83		19	268.47
South Asia	324.15	537.76	495.10	353.56	226.31	359.24	245.50	350.18	319.29	344.67	269.51	305.03	296.34	223.23	251.95	364.15	287.44	66.04		390.50		19	316.32
Monitor=>	BD	BF	BR	CA	CH	CN	DE	DZ	EDU	GOV	IT	JO	JP	LK	MY	NET	ORG	PK	SU	TW	ZA	Available	Average

LOSS

This is typically an edge effect.

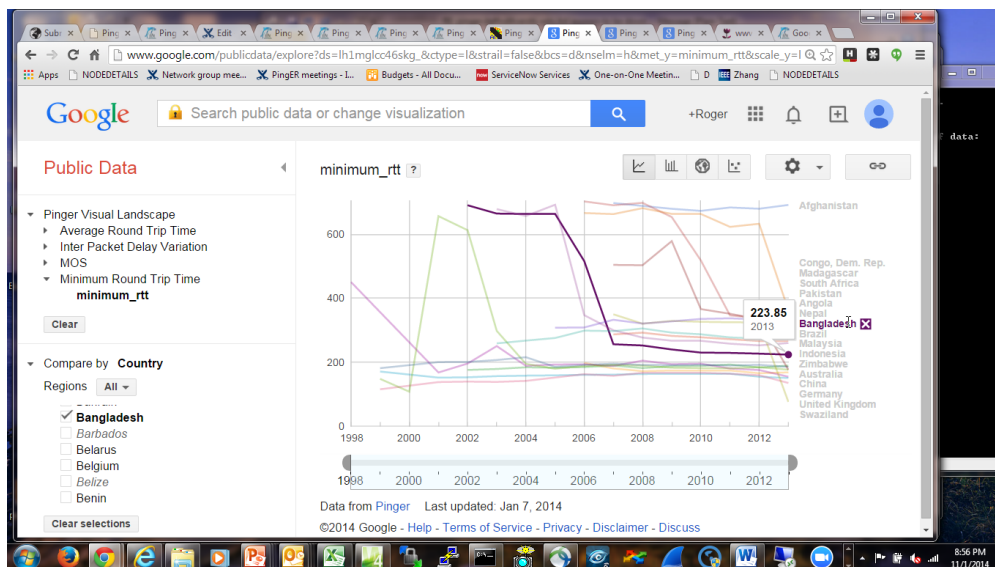
WORLD, Δ, V	BD, Δ, V	BE, Δ, V	BR, Δ, V	CA, Δ, V	CH, Δ, V	CN, Δ, V	DE, Δ, V	DZ, Δ, V	EDU, Δ, V	GOV, Δ, V	IT, Δ, V	JO, Δ, V	JP, Δ, V	LK, Δ, V	MY, Δ, V	NET, Δ, V	ORG, Δ, V	PK, Δ, V	SU, Δ, V	TW, Δ, V	ZA, Δ, V	Available	Average
Africa,	1.61	1.87	1.88	2.06	1.73	2.24	2.07	2.27	1.71	1.61	1.34	1.41	0.64	1.43	1.78	1.57	0.14	1.93	2.07	1.49	1.10	21	2.25
Balkans,	0.28	0.45	0.23	0.29	0.03	0.55	0.08	1.23	0.27	0.18	0.06	0.14	0.15	0.13	0.55	0.25	0.14	0.53	0.13	0.21	0.15	21	0.95
Central Asia,	9.00	19.05	12.23	13.43	11.80	18.79	11.98	5.65	3.97	5.82	10.47	5.49	0.07	9.97	10.43	9.81	0.04	7.19	7.88	0.24	0.45	21	8.95
East Asia,	0.34	14.28	0.39	0.54	0.20	0.33	0.27	1.01	0.64	0.13	0.17	0.54	0.12	0.28	0.51	0.78	0.39	0.87	0.69	0.24	0.45	21	1.10
Europe,	0.52	16.49	2.96	1.87	3.51	4.16	3.31	2.50	0.97	1.57	0.32	1.49	0.74	1.53	1.87	1.51	1.68	2.29	0.71	1.35	0.16	21	2.41
Latin America,	0.91	14.69	0.51	0.49	0.28	0.41	0.36	1.57	0.86	0.47	0.41	0.57	0.58	0.47	0.94	0.57	0.54	0.93		0.34	0.78	20	1.33
Middle East,	0.59	14.47	0.47	0.42	0.26	0.53	0.29	1.32	0.60	0.51	0.22	0.33	0.32	0.31	0.71	0.45	0.39	0.74		0.31		19	1.22
North America,	0.43	14.59	0.11	0.05	0.05	0.41	0.19	1.19	0.09	0.02	0.11	0.19	0.22	0.26	0.97	0.86	0.01	0.73	0.41	0.30	0.19	21	1.01
Oceania,	0.21	15.09	0.15	0.08	0.15	0.11	0.13	1.22	0.31	0.05	0.09	0.12	0.27	0.09	0.56	0.02	0.27	0.73		0.33		19	1.05
Russia,	0.33	13.93	0.32	0.31	0.14	0.39	0.16	1.01	1.43	0.89	0.40	0.18	2.19	0.39	0.86	0.62	0.10	0.55		0.08		19	1.28
S.E. Asia,	1.84	16.02	2.32	2.31	1.97	2.55	2.09	2.39	1.42	2.30	2.08	1.53	3.72	2.24	1.86	2.17	0.89	2.20		2.08		19	2.84
South Asia,	0.77	14.99	1.11	0.74	0.58	0.97	0.72	1.66	1.00	0.59	0.54	0.74	0.65	0.60	1.32	0.60	0.51	0.90		0.71		19	1.56
Monitor=>	BD	BE	BR	CA	CH	CN	DE	DZ	EDU	GOV	IT	JO	JP	LK	MY	NET	ORG	PK	SU	TW	ZA	Available	Average

Minimum RTT

This mainly a measure of the route length between the source and destination. All regions are reachable by terrestrial routes (i.e. no minimum RTT > 400ms).

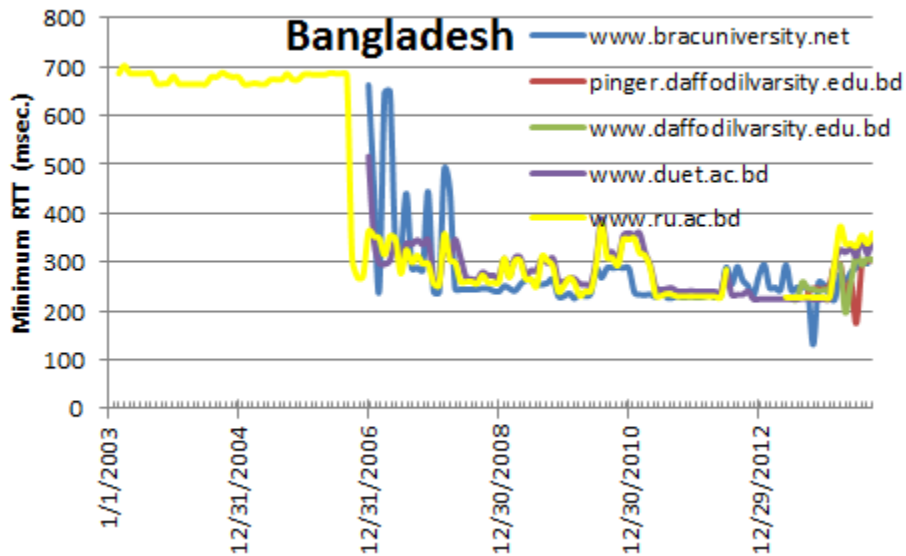
WORLD, Δ, V	BD, Δ, V	BE, Δ, V	BR, Δ, V	CA, Δ, V	CH, Δ, V	CN, Δ, V	DE, Δ, V	DZ, Δ, V	EDU, Δ, V	GOV, Δ, V	IT, Δ, V	JO, Δ, V	JP, Δ, V	LK, Δ, V	MY, Δ, V	NET, Δ, V	ORG, Δ, V	PK, Δ, V	SU, Δ, V	TW, Δ, V	ZA, Δ, V	Available	Average
Africa,	304.84	267.32	372.20	286.09	163.49	238.15	182.53	211.76	295.12	239.17	182.06	224.98	410.08	306.13	403.90	287.38	383.22	291.69	159.35	491.10	222.97	21	288.31
Balkans,	207.50	165.00	265.67	179.79	42.25	262.13	46.96	74.48	194.71	129.76	38.31	102.24	315.35	191.05	281.98	188.23	185.35	182.42	130.64	329.63	249.44	21	179.19
Central Asia,	303.15	270.55	335.09	227.61	147.65	280.74	129.02	100.45	253.86	200.25	132.43	186.84	367.83	284.46	306.69	235.02	259.86	282.01		281.64		19	246.06
East Asia,	302.06	416.11	347.16	177.58	246.07	76.53	262.98	349.85	154.38	212.35	260.47	348.82	82.25	221.71	118.67	175.63	155.34	358.22	165.24	66.57	432.03	21	234.66
Europe,	225.85	153.86	250.00	155.35	30.47	213.77	34.52	82.22	180.34	122.74	38.71	95.62	289.95	193.40	261.79	153.28	189.30	100.89	114.28	317.02	227.88	21	167.68
Latin America,	365.35	308.69	167.31	165.33	210.98	324.37	219.47	259.89	162.57	121.40	212.95	248.89	275.06	351.77	340.12	153.94	178.85	349.69		306.38	377.71	20	255.04
Middle East,	232.08	190.47	279.46	204.79	69.95	293.71	77.02	117.91	234.86	144.37	76.23	131.81	318.97	224.95	303.16	207.43	235.75	212.47		354.37		19	205.78
North America,	285.05	244.44	195.46	60.59	143.84	203.15	134.12	180.96	56.90	46.67	155.33	176.54	168.07	325.74	246.70	35.47	83.72	287.38	214.78	197.91	342.79	21	180.27
Oceania,	328.12	333.06	361.88	171.32	311.15	322.07	317.53	377.96	205.46	230.20	306.24	377.65	309.50	197.83	150.95	185.30	190.32	346.12		312.15		19	286.53
Russia,	265.44	199.46	306.16	206.67	178.04	265.60	123.98	128.15	230.11	216.24	132.45	140.89	289.15	277.11	334.40	211.45	213.91	230.57		219.72		19	219.45
S.E. Asia,	181.59	118.80	399.54	234.43	280.98	90.93	299.61	327.79	212.01	277.65	295.95	371.91	109.22	159.97	55.20	224.44	204.89	301.76		106.29		19	239.34
South Asia,	299.47	319.26	478.69	340.79	215.88	343.66	230.97	248.36	307.43	324.17	256.33	288.99	282.73	211.23	231.28	352.64	278.25	61.40		370.74		19	286.43
Monitor=>	BD	BE	BR	CA	CH	CN	DE	DZ	EDU	GOV	IT	JO	JP	LK	MY	NET	ORG	PK	SU	TW	ZA	Available	Average

Looking at the long term minimum RTT from SLAC to Bangladesh seen below it is apparent that the connection switched from using geostationary satellites (>450ms) to terrestrial connections (< 450ms) in 2006.



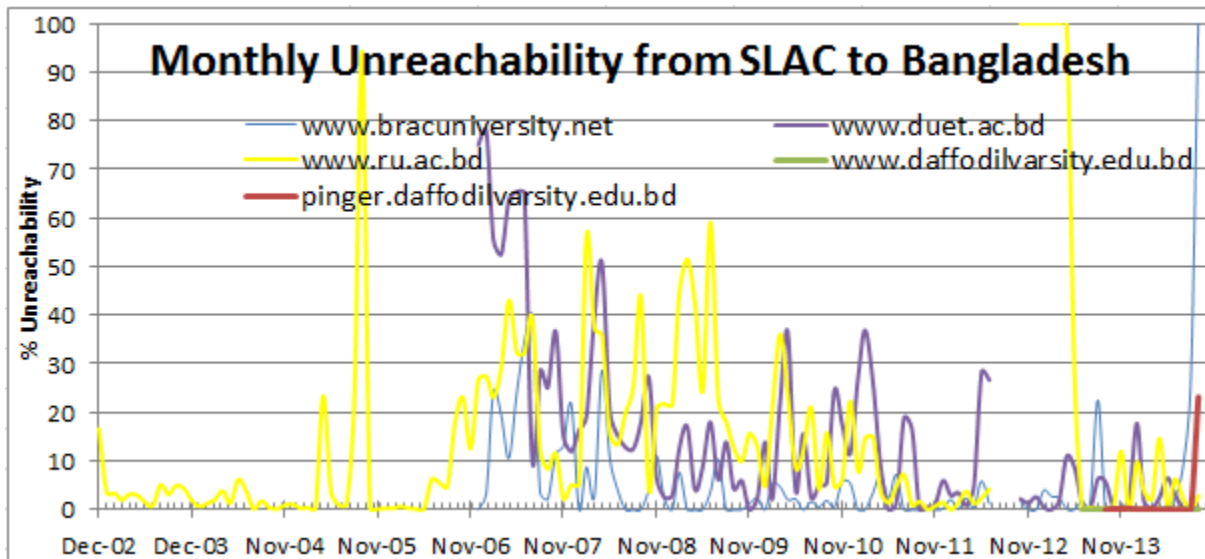
Looking in more detail at the minimum RTTs from SLAC to Bangladesh see the plot below showing the cut-over for the RU university on 11 October 2006 around 7:00am UDT. The [spreadsheet is here](#).

Minimum RTT seen from SLAC to



Unreachability

If none of the pings sent each half hour respond then the target remote host is deemed unreachable. The plot below shows the monthly unreachability seen from SLAC to Bangladeshi hosts.



Jitter

This is typically an edge effect.

WORLD, △, V	BD, △, V	BR, △, V	CA, △, V	CN, △, V	DE, △, V	DZ, △, V	EDU, △, V	GOV, △, V	IT, △, V	JO, △, V	JP, △, V	LK, △, V	MY, △, V	NET, △, V	ORG, △, V	PK, △, V	SU, △, V	TW, △, V	ZA, △, V	Available	Average
Africa,	8.61	9.73	9.74	11.41	10.16	11.27	9.42	10.18	8.33	11.57	4.81	9.31	12.96	9.91	2.21	9.73	2.96	18.29	16.11	19	9.83
Balkans,	1.57	0.96	1.31	0.91	0.94	3.20	1.62	1.30	0.48	4.83	0.67	1.64	3.73	1.27	0.29	1.14	0.13	1.66	2.60	19	1.59
Central Asia,	2.14	1.03	1.01	1.47	1.61	3.14	2.82	1.20	1.00	7.30	0.48	1.57	4.57	1.40	0.27	1.43		12.46		17	2.64
East Asia,	2.04	1.50	5.03	1.49	2.15	4.95	2.87	1.47	1.56	6.12	3.48	3.36	3.73	1.84	1.36	2.18	2.99	2.04	6.20	19	2.97
Europe,	2.13	0.69	1.22	0.97	0.70	3.22	1.43	1.48	0.30	7.66	0.97	2.24	4.24	1.69	0.67	1.34	0.48	1.44	2.56	19	1.86
Latin America,	3.14	1.43	1.51	2.32	2.02	4.24	3.16	1.51	1.47	4.37	1.31	1.92	6.43	1.62	2.10	2.18		10.20	3.20	18	3.01
Middle East,	2.77	1.78	1.35	2.06	3.46	5.18	2.99	6.83	2.67	6.94	1.28	2.21	4.39	1.69	1.49	3.36		14.10		17	3.80
North America,	4.81	0.49	1.16	1.66	1.36	3.58	0.88	0.71	0.63	3.02	1.00	2.38	4.09	0.75	0.52	1.81	1.46	1.73	2.97	19	1.84
Oceania,	3.25	0.45	0.67	1.02	0.79	2.77	1.08	0.58	1.42	3.47	0.50	1.66	2.20	0.49	0.42	1.63		1.41		17	1.40
Russia,	1.53	1.16	1.54	1.27	1.07	4.17	1.85	5.98	0.77	5.40	0.98	0.60	4.92	4.89	0.66	1.08		0.76		17	2.27
S.E. Asia,	2.59	2.91	2.53	2.58	2.90	4.03	4.58	2.46	2.44	5.00	1.47	3.63	4.99	2.85	2.43	3.13		2.24		17	3.10
South Asia,	2.97	2.96	3.51	3.54	3.25	3.94	3.11	3.03	3.39	3.29	2.64	2.26	5.08	3.00	2.15	0.85		10.18		17	3.48
Monitor=>	BD	BR	CA	CN	DE	DZ	EDU	GOV	IT	JO	JP	LK	MY	NET	ORG	PK	SU	TW	ZA	Available	Average

Mean Opinion Score

This is a function of the average RTT, the packet loss and the jitter. It indicates how good a phone call is expected to be. Typically with MOS values above say 3.6 calls become acceptable. Thus VoIP calls should be of acceptable via the Internet between Daffodil International University and the regions in yellow and green in the table below.

WORLD, △, V	BD, △, V	BF, △, V	BR, △, V	CA, △, V	CH, △, V	CN, △, V	DE, △, V	DZ, △, V	EDU, △, V	GOV, △, V	IN, △, V	IT, △, V	JO, △, V	JP, △, V	LK, △, V	MY, △, V	NET, △, V	ORG, △, V	PK, △, V	SU, △, V	TW, △, V	ZA, △, V	Available	Average
Africa,	3.35		3.03	3.41		2.72	3.71	3.24	3.38	3.59		3.84	3.68	3.08	3.32	2.83	3.41	3.30	3.36	4.06	2.74	3.59	19	3.35
Balkans,	4.07		3.86	4.18		3.82	4.39	4.05	4.13	4.29		4.40	4.30	3.69	4.15	3.72	4.16	4.19	4.12	4.30	3.57	3.91	19	4.07
Central Asia,	2.03		2.00	3.27		2.06	3.39	3.19	3.58	3.58		3.43	3.40	3.44	2.03	2.01	3.28	3.93	3.23		2.03		17	3.27
East Asia,	3.55		3.47	4.11		4.29	3.82	3.89	4.18	4.09		3.88	3.38	4.31	3.93	4.25	4.14	4.21	3.28	4.19	4.34	2.02	19	3.85
Europe,	3.96		3.75	4.11		3.73	4.11	3.95	4.13	4.20		4.37	4.21	3.75	4.04	3.70	4.15	4.09	3.96	4.24	3.59	4.00	19	4.00
Latin America,	3.23		4.13	4.14		3.55	3.99	3.22	4.10	4.24		4.02	3.84	3.77	3.38	3.32	4.18	4.10	3.35		3.51	3.18	18	3.74
Middle East,	3.89		3.78	4.09		3.67	4.34	3.88	3.92	4.19		4.35	4.25	3.63	3.98	3.59	4.07	3.99	3.98		3.27		17	3.93
North America,	3.70		4.15	4.39		4.09	4.27	3.65	4.38	4.40		4.23	4.20	4.21	3.56	3.83	4.34	4.37	3.69	4.04	4.13	3.47	19	4.06
Oceania,	3.52		3.46	4.26		3.65	3.65	2.73	4.02	4.01		3.71	3.33	3.70	4.12	4.13	4.19	4.18	3.39		3.67		17	3.75
Russia,	3.82		3.67	4.08		3.80	4.28	3.89	3.81	3.73		4.24	4.28	3.50	3.77	3.40	3.81	4.10	3.94		4.06		17	3.89
S.E. Asia,	3.97		3.03	3.81		4.17	3.52	2.86	3.91	3.64		3.59	3.23	4.02	3.93	4.18	3.85	4.03	3.39		4.18		17	3.72
South Asia,	3.36		2.71	3.41		3.34	3.85	3.31	3.56	3.46		3.75	3.62	3.64	3.82	3.72	3.38	3.77	4.19		3.25		17	3.54
Monitor=>	BD	BF	BR	CA	CH	CN	DE	DZ	EDU	GOV	IN	IT	JO	JP	LK	MY	NET	ORG	PK	SU	TW	ZA	Available	Average

Directivity

How direct the route is between a source (monitor) and destination (monitored/remote) site is given by the directivity index. A value of 1.0 indicates that the route is a great circle route between the sites. Smaller values indicate the route is less direct. It is seen that the routes between Daffodil International University and North America and Latin America are the most direct with values of 0.42 and 0.45. Other routes are more indirect, with the route to South Asia being the least direct.

WORLD, △, V	BD, △, V	BF, △, V	BR, △, V	CA, △, V	CH, △, V	CN, △, V	DE, △, V	DZ, △, V	EDU, △, V	GOV, △, V	IN, △, V	IT, △, V	JO, △, V	JP, △, V	LK, △, V	MY, △, V	NET, △, V	ORG, △, V	PK, △, V	SU, △, V	TW, △, V	ZA, △, V	Available	Average
Africa,	0.31	0.13	0.21	0.47	0.36	0.28	0.36	0.22	0.49	0.44		0.31	0.22	0.32	0.28	0.27	0.49	0.42	0.26	0.31	0.29	0.20	21	0.32
Balkans,	0.33	0.26	0.38	0.49	0.25	0.31	0.28	0.23	0.53	0.58		0.33	0.20	0.30	0.38	0.35	0.53	0.54	0.28	0.36	0.28	0.34	21	0.35
Central Asia,	0.32	0.29	0.41	0.42	0.37	0.32	0.37	0.35	0.44	0.53		0.33	0.16	0.35	0.19	0.23	0.46	0.44	0.09		0.22		19	0.30
East Asia,	0.35	0.30	0.52	0.52	0.38	0.32	0.33	0.29	0.63	0.54		0.34	0.23	0.23	0.28	0.39	0.58	0.66	0.35	0.28	0.31	0.30	21	0.36
Europe,	0.31	0.31	0.41	0.47	0.35	0.36	0.30	0.24	0.52	0.58		0.26	0.29	0.32	0.39	0.38	0.53	0.51	0.28	0.42	0.28	0.42	21	0.38
Latin America,	0.45	0.29	0.29	0.44	0.48	0.48	0.47	0.36	0.44	0.39		0.50	0.49	0.56	0.49	0.53	0.41	0.43	0.43		0.56	0.33	20	0.44
Middle East,	0.25	0.24	0.38	0.51	0.39	0.25	0.37	0.24	0.53	0.64		0.28	0.03	0.28	0.26	0.28	0.56	0.50	0.12		0.23		19	0.34
North America,	0.42	0.39	0.48	0.45	0.51	0.49	0.54	0.43	0.45	0.45		0.51	0.58	0.59	0.43	0.57	0.43	0.39	0.40	0.44	0.57	0.43	21	0.47
Oceania,	0.27	0.37	0.37	0.76	0.53	0.28	0.50	0.44	0.63	0.67		0.52	0.37	0.23	0.43	0.49	0.69	0.68	0.32		0.23		19	0.46
Russia,	0.38	0.37	0.43	0.41	0.33	0.32	0.29	0.36	0.42	0.41		0.31	0.25	0.24	0.22	0.22	0.44	0.46	0.35		0.27		19	0.31
S.E. Asia,	0.39	0.30	0.41	0.53	0.39	0.46	0.35	0.34	0.64	0.53		0.35	0.22	0.49	0.26	0.22	0.59	0.68	0.20		0.30		19	0.39
South Asia,	0.06	0.30	0.31	0.36	0.37	0.16	0.32	0.34	0.42	0.42		0.29	0.17	0.26	0.14	0.26	0.39	0.50	0.26		0.14		19	0.29
Monitor=>	BD	BF	BR	CA	CH	CN	DE	DZ	EDU	GOV	IN	IT	JO	JP	LK	MY	NET	ORG	PK	SU	TW	ZA	Available	Average

Looking in a bit more detail at the connections between Daffodil International University and S. Asia we find:

- The one country with a reasonable Directivity (0.25) with Daffodil International University is Sri Lanka.
- The minimum RTT to Afghanistan is ~ 650msec indicating is probably connected via a geo stationary satellite link.

- Since the traceroute server at Daffodil International University is not working instead we look at the reverse routes to Daffodil International University from Pakistan. The [route from Pakistan to Daffodil International University](#) actually goes from Pakistan to Europe and then back to Singapore and Bangladesh hence accounting for the low value of Directivity. A similar result is seen for the route from Pakistan to Duet.

Round Trip times in Bangladesh

These are shown from between Daffodil International University hosts and from Daffodil International University to Duet.

The RTTs from pinger to www at Daffodil International University show that the Daffodil International University monitor pretty stable.

The distance as crow flies between pinger.daffodilvarsity.edu.bd and www.duet.ac.bd = 189.2 km. or a minimum RTT (as constrained by speed of light in fibre) = 1.892. the average minimum RTT from Daffodil International University to Duet is 2.55msec. This corresponds to a Directivity of 0.74, i.e. the route is pretty direct. The spreadsheet of the data from which the plots below were derived is [here](#). The variability of the RTTs is much greater than that between hosts at the Daffodil International University site (first plot). Thus most of the variability is attributed to the route between Daffodil International University and Duet and possibly the host at Duet.

