



Status of implementation of IPv6 in Bangladesh- Challenges and its Future

HELLO!

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IPv6 Deployment Status -Bangladesh

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Let's start with the country first

Resources Delegated to BD

1021 - AS Numbers

6908 – IPv4 Prefixes /24

792 – IPv6 Prefixes \leq /48

<ftp://ftp.apnic.net/pub/stats/apnic/delegated-apnic-latest>

IPv6 vs IPv4 Prefix Announcement

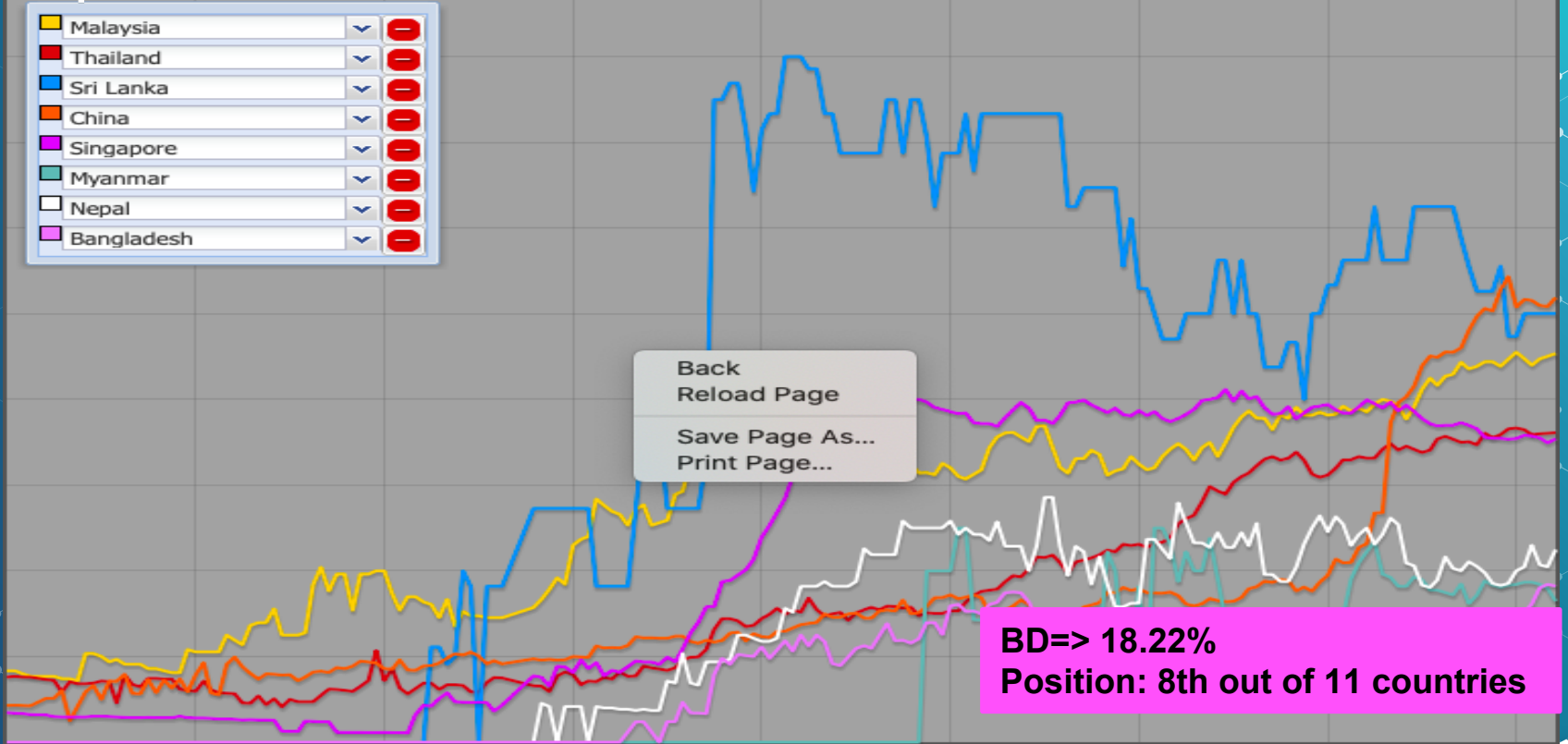
Country	IPv4		IPv6	
	Prefix	ASN	Prefix	ASN
China	47603	752	5420	344
Thailand	9447	406	1286	143
Singapore	6722	516	1262	184
Bangladesh	5717	864	726	157
Malaysia	2865	228	366	114
Myanmar	556	55	155	15
Sri Lanka	467	20	147	9
Pakistan	5321	179	143	24
Nepal	854	91	80	21
Cambodia	1817	108	78	24
Afghanistan	375	57	3	2

Bangladesh positioned 4th out of 11 countries

Updated on: 23 July, 2020

Source: http://bgp.he.net/report/prefixes#_countriesv6

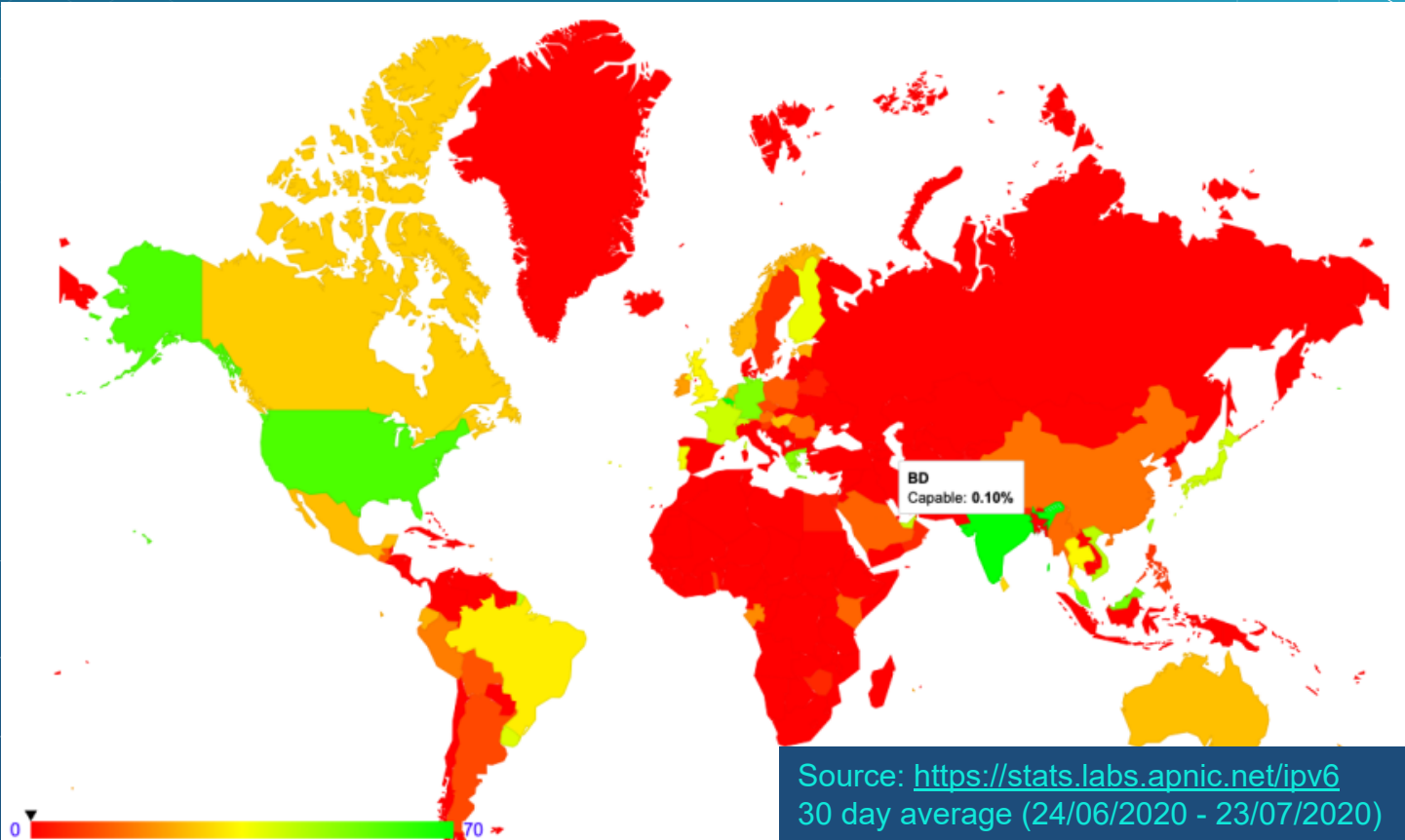
Percentage of Networks (AS) announcing IPv6 prefix



Date: 01 June, 2020

Source: <http://v6asns.ripe.net/v/6>

IPv6 capability rate (by %)



IPv6 Deployment Status

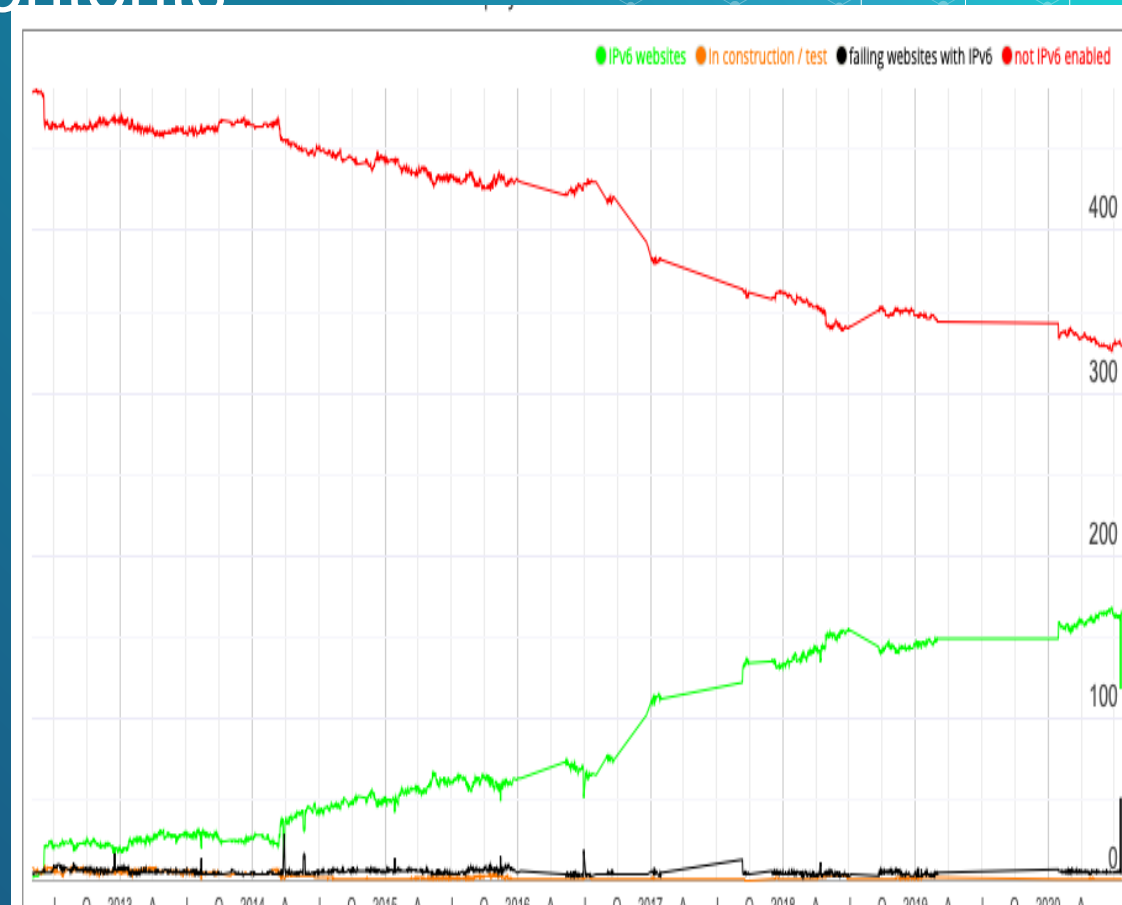
APNIC Index	CC	Internet Users	IPv6 Users	IPv6 User Ratio
7	MY	27,847,051	13,405,660	48.14%
24	TH	44,569,765	13,369,283	30.00%
29	LK	8,054,950	2,142,589	26.60%
44	CN	823,871,288	127,070,190	15.42%
45	SG	5,116,443	759,136	14.84%
56	MM	21,283,448	2,242,928	10.54%
67	NP	7,159,136	509,109	7.11%
113	AF	5,313,081	4,967	0.09%
119	BD	33,062,068	16,526	0.05%
127	PK	36,148		
130	KH	6,966,372	1,426	0.02%

Bangladesh positioned 9th out of 11 countries

IPv6 Enabled Contents

◆ July 15, 2020: Among the Top 500 websites ranked by Alexa visited from Bangladesh

- ◆ IPv6 Enabled: 163
- ◆ On Construction: 1
- ◆ Failed: 5
- ◆ IPv6 not Enabled: 329





.bd ccTLD Readiness

Authoritative answers can be found from:

bd nameserver = dns.bd.

bd nameserver = bd-ns.anycast.pch.net.

bd nameserver = surma.btcl.net.bd.

bd nameserver = jamuna.btcl.net.bd.

dns.bd internet address = 123.49.12.112

bd-ns.anycast.pch.net internet address = 204.61.216.108

surma.btcl.net.bd internet address = 203.112.194.232

jamuna.btcl.net.bd internet address = 203.112.194.231

dns.bd has AAAA address 2407:5000:88:5::3

bd-ns.anycast.pch.net has AAAA address 2001:500:14:6108:ad::1

surma.btcl.net.bd has AAAA address 2407:5000:88:4::232

jamuna.btcl.net.bd has AAAA address 2407:5000:88:4::231

“nslookup” output on root name servers


.bd ccTLD Readiness


◆ Glued at root but no AAAA domain glued under it


TLD Info | Sample A Records | Sample AAAA Records


.bd TLD Report


Description: Bangladesh

Nameserver Status 

IPv4 Enabled Nameservers 

A Glue in the Root Zone 

IPv6 Enabled Nameservers 

AAAA Glue in the Root Zone 

Delegated to: Ministry of Post & Telecommunications

Domains: 5,061

A records: 2,974

Glue: 7,388









AAAA records: 1

AAAA glue: 0

Updated: 28 Jun 2018 08:11 PST

Range	Prefix	Count
unicast		2,839
invalid		131
this-network	0.0.0.0/8	3
loopback	127.0.0.0/8	1

Range	Prefix	Count
unicast	2000::/3	0
invalid		0
localhost	::1/128	1

Nameserver	Pass	A	Pass	AAAA
dns.bd		123.49.12.112		2407:5000:88:5::3
bd-ns.anycast.pch.net		204.61.216.108		2001:500:14:6108:ad::1
surma.btcl.net.bd		203.112.194.232		2407:5000:88:4::232
jamuna.btcl.net.bd		203.112.194.231		2407:5000:88:4::231

IPv6 Preparedness – Bangladesh [In brief]

Capability: 0.10%

Users: 0.05%

Prefix Announcement: 18.22%

ccTLD: Configured but no domain glued under it

<ftp://ftp.apnic.net/pub/stats/apnic/delegated-apnic-latest>

A white double quote icon inside a dark blue hexagonal shape, which is part of a vertical blue bar at the top center of the slide.

Although there are some
piecemeal development,
however Bangladesh is still
far behind others in the
deployment of IPv6

IPv6 Deployment Status

-BdREN

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How about our Organization

Allocation for BdREN

- ◆ ASN: 63961
- ◆ IPv6 Prefix of BdREN: 2402:f500::/32
- ◆ IPv4Prefix of BdREN:
 - ◇ 103.28.120.0/22
 - ◇ 163.47.36.0/22
- ◆ IPv6 Configured as “Dual Stack”



IPv6 Enabled: Routing and Switching







Test your IPv6 connectivity.

Summary

Tests Run

Share Results / Contact

Other IPv6 Sites

-  Your IPv4 address on the public Internet appears to be 163.47.37.7
-  Your IPv6 address on the public Internet appears to be 2402:f500:3:1:693d:1e4e:c1e0:c280
-  Your Internet Service Provider (ISP) appears to be BDREN-UGC-AS-AP Bangladesh Research and Education Network (BdREN)
-  Since you have IPv6, we are including a tab that shows how well you can reach other IPv6 sites. [\[more info\]](#)
-  HTTPS support on this web site is in *beta*. [\[more info\]](#)
-  Your DNS server (possibly run by your ISP) appears to have IPv6 Internet access.

Your readiness score

10/10

for your IPv6 stability and readiness, when publishers are forced to go IPv6 only

[Source: <https://test-ipv6.com>]

BdREN Readiness: DNS Servers

SuperTool Beta7

bdren.net.bd AAAA Lookup

aaaa:bdren.net.bd Find Problems

Type	Domain Name	IPv6 Address	TTL
AAAA	bdren.net.bd	2402:f500:3::11	24 hrs
AAAA	bdren.net.bd	2402:f500:3:1::12	24 hrs

Test	Result
✓ DNS Record Published	DNS Record found

Reported by ns1.bdren.net.bd on 7/23/2020 at 10:07:19 PM (UTC -5), just for you.

```
ns1.bdren.net.bd. 86400 IN A 193.20.141.11
ns2.bdren.net.bd. 86400 IN A 163.47.37.12
ns1.bdren.net.bd. 86400 IN AAAA 2402:f500:3::11
ns2.bdren.net.bd. 86400 IN AAAA 2402:f500:3:1::12
```

BdREN Readiness: Web Server

IPv6 validation for <http://www.bdren.net.bd>

Tested on	Fri, 24 Jul 2020 03:00:14 GMT
AAAA DNS record	✓ 2402:f500:3::60
IPv6 web server	✓ Apache
IPv6 DNS server	✓ surma.btcl.net.bd,jamuna.btcl.net.bd, bd-ns.anycast.pch.net,dns.bd



Source: <https://ipv6-test.com/validate.php>

IPv6 Readiness: BGP Peers



HURRICANE ELECTRIC
INTERNET SERVICES

Search

AS63961 Bangladesh Research and Education Network (BdREN)

Quick Links

[BGP Toolkit Home](#)
[BGP Prefix Report](#)
[BGP Peer Report](#)
[Exchange Report](#)

Upstream

[Multi Origin Routes](#)
[DNS Report](#)
[Top Host Report](#)
[Internet Statistics](#)
[Looking Glass](#)

Downstream

[IPv6 Certification](#)
[IPv6 Progress](#)
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[AS Info](#)[Graph v4](#)[Graph v6](#)[Prefixes v4](#)[Prefixes v6](#)[Peers v4](#)[Peers v6](#)[Whois](#)[IRR](#)

Rank	Description		IPv4	Peer
1	Bangladesh Telegraph & Telephone Board (BTTB)		X	AS17494
2	Bangladesh Submarine Cable Company Limited (BSCCL)		X	AS132602
3	NKN INTERNET GATEWAY NETWORK		X	AS9885
4	Jahangirnagar University		X	AS139251
5	Shahjalal University of Science and Technology		X	AS133168
6	Bangladesh Agricultural University (BAU)		X	AS132365
7	Independent Univeristy, Bangladesh		X	AS136134
8	university of dhaka		X	AS135524

Source: https://bgp.he.net/AS63961#_peers6

IPv6 Readiness: IPv4 vs IPv6



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AS Info **Graph v4** Graph v6 Prefixes v4 Prefixes v6 Peers v4 Peers v6 Whois IRR

Company Website:

<http://www.bdren.net.bd>

Country of Origin:

Bangladesh 

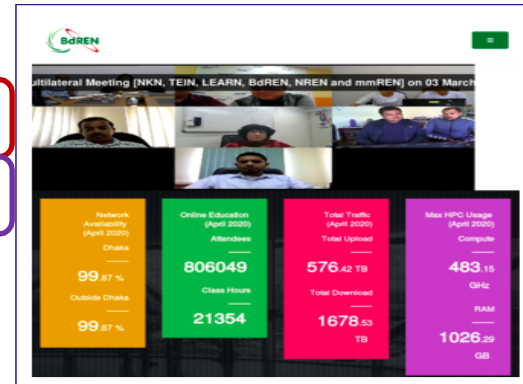
Prefixes Originated (all): 4
Prefixes Originated (v4): 3
Prefixes Originated (v6): 1

Prefixes Announced (all): 62
Prefixes Announced (v4): 56
Prefixes Announced (v6): 6

BGP Peers Observed (all): 27
BGP Peers Observed (v4): 27
BGP Peers Observed (v6): 8

IPs Originated (v4): 2,304
AS Paths Observed (v4): 1,646
AS Paths Observed (v6): 483

Average AS Path Length (all): 4.736
Average AS Path Length (v4): 4.807
Average AS Path Length (v6): 4.491



Source: https://bgp.he.net/AS63961#_asinfo

BdREN Readiness: IPv6

- ◆ Web Server



- ◆ Mail Server



- ◆ DNS Server



- ◆ Routing and Switching



- ◆ Upstream Peers: 3/3



- ◆ Downstream Peers 5/24





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Challenges and Fear

Challenges drive us forward

Challenges

◆ Mindset

- ◆ My IPv4 works fine, I won't need IPv6
- ◆ Don't change it unless it is broken
- ◆ Wait and See policy: Let's see how others deal with it
- ◆ Lack of confidence: If anything goes wrong, it's because of IPv6

◆ Technical

- ◆ Lack of awareness: IPv6 seems too complicated
- ◆ Compatibility: Hardware and software not supported
- ◆ Upgrade: Involves \$\$\$



And... The Fear

IPv6

Link-Local

Dual Stack

Tunneling

DHCPv6

FE80::/10

AAAA

128 Bit

ping6

::/64

EUI-64

OSPFv3

SLAAC

Sub-netting



Efforts

- ◆ **SANOG, bdNOG, ISPAB:** Hosting at least 2 workshops each year with active support from APNIC.
- ◆ **BdREN:** Conducted several workshops and capacity building programs on IPv6 deployment in campus networks.



Change Makers

- ◆ Government
- ◆ Regulators
- ◆ Telecom Operators
- ◆ ISPs
- ◆ Content Providers
- ◆ RENS



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Way Forward and Roadmap

Overcoming the Challenges

Way Forward...

- ◆ **IPv6 Roadmap:** may be initiated by the Regulator
- ◆ **National IPv6 Taskforce:** needs to be initiated by Government.
- ◆ **More awareness development:** ISP association, ISOC-BD, BdREN should take drive



BdREN Roadmap

○ **Within BdREN**

- BdREN has its plan to configure IPv6 in its mail server
- Plan to configure all eduroam servers and cloud Virtual Machine (VM)
- Ensure AAAA record entry in .bd dns server

○ **Within Member Institutions**

- Assist universities to turn their campus network IPv6 enabled
- Assist universities to configure DNS server IPv6 enabled

○ **Peering with Member Institutions**

- Establish IPv6 peering with its member institutions who have already APNIC delegations
- Establish IPv6 peering with its member institutions who does not have their own APNIC delegations by allocating IPv6 address space



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Expectations from Project

To be ensured by project movers

Expectation from the Project

- ◆ Building IPv6 Implementation Taskforce among participating NRENs
- ◆ IPv6 Traffic Isolation and Measurements
- ◆ Prepare “Deliverables” and disseminate among the members
- ◆ Involve NREN engineers directly to the project activities and thereby develop their capacity

Acknowledgement

Special thanks to the people who helped me by extending all the resources:



Md. Abdul Awal
Manager, Bangladesh
Computer Council



Md. Ariful Islam
Manager, Data and
Transmission, BdEN

THANK S!

ANY QUESTIONS?

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