CAREN for IPv6 deployment and measurement practices in Central Asia

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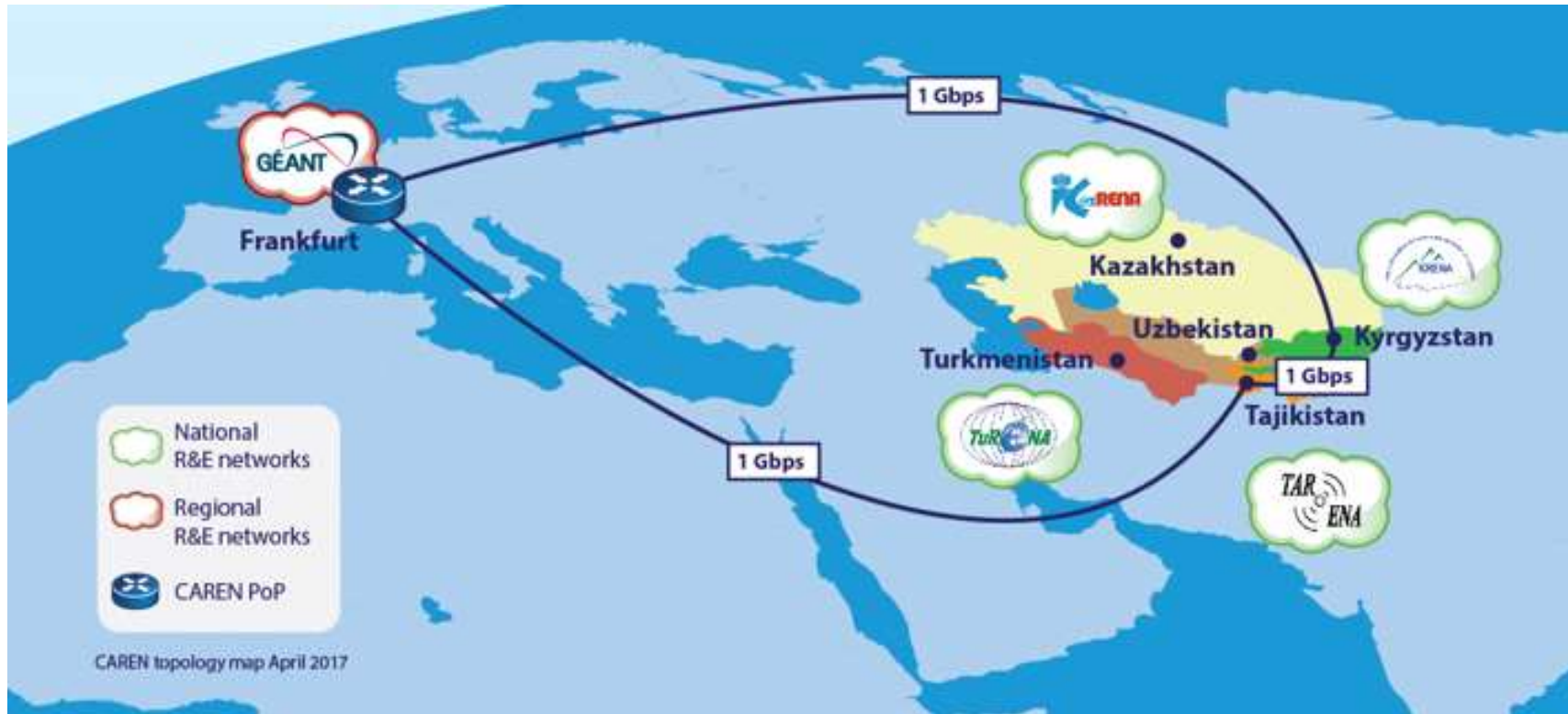**The Central Asian Research and Education Network**

Outlines

- CAREN

- IPv6 deployment in Central Asia

- CAREN and RIPE NCC cooperation in capacity building

At the Heart of Global Research and Education Networking

GÉANT and partner networks enabling user collaboration across the globe

April 2017

Legend:
- GÉANT Coverage
- RedCLARA Network
- EUMEDCONNECT3 Network
- TEIN Network
- AfricaConnect2: UbuntuNet Alliance, WACREN & ASREN
- CAREN Network
- EaPConnect Network
- Other R&E Networks
- : ACE & TransPAC

Dark Shading: Connected to regional network
Light Shading: Eligible to connect to regional network

- Multiple 100 Gbps links
- 100 Gbps
- Multiples of 10 Gbps
- 10 Gbps
- 10 Gbps backup
- >1 Gbps<10 Gbps
- ≤1 Gbps

www.geant.org

CAREN

Frankfurt

1 Gbps

Kazakhstan

Uzbekistan

Kyrgyzstan

Turkmenistan

Tajikistan

1 Gbps

1 Gbps

National
R&E networks

Regional
R&E networks

CAREN PoP

CAREN topology map April 2017

DANTE

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High level overview of the CAREN service

| | CAREN service availability | | CAREN Circuit's Availability | | | | | |
| | Bishkek | Dushanbe | Frankfurt-Bishkek | | Frankfurt-Dushanbe | | Bishkek-Dushanbe | |
	SLA %	SLA %	# of outages	SLA %	# of outages	SLA %	# of outages	SLA %
Date/YTD for 2017	99.82%	99.72%	4.00	97.73%	3.08	92.78%	2.33	98.37%
Date/YTD for 2018	99.99%	99.92%	2.50	98.42%	4.50	99.39%	4.50	99.88%
Jan-18	99.98%	99.94%	1	99.98 %	3	99.56 %	7	99.88 %
Feb-18	100.00%	99.89%	4	96.69 %	6	99.19 %	2	99.89 %
Mar-18								
Apr-18								

IPv6 deployment in the region by country

- **Kazakhstan**: **IPv6 Deployment :** 16.8% (Prefixes : 21.28% | Transit AS : 67.19% | Content : 46.96% | Users : 0%) **Relative Index** : 1.8 out of 10

- **Kyrgyzstan**: **IPv6 Deployment :** 13.08% (Prefixes : 33.33% | Transit AS : 52.3% | Content : 45.9% | Users : 0%) **Relative Index** : 1.4 out of 10

- **Tajikistan: IPv6 Deployment :** 0.87% (Prefixes : 25% | Transit AS : 1.39% | Content : 48.43% | Users : 0.01%) **Relative Index** : 0.1 out of 10

- **Turkmenistan: IPv6 Deployment :** 2.59% (Prefixes : 0% | Transit AS : 0% | Content : 59.65% | Users : 0.2%) **Relative Index** : 0.5 out of 10

- **Uzbekistan: IPv6 Deployment :** 0.14% (Prefixes : 18.75% | Transit AS : 0.57% | Content : 43.92% | Users : 0%) **Relative Index** : 0 out of 10

Reference: http://6lab.cisco.com/stats/

Updated on 2018-6-4

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IPv6 capability in the region

CC	Country	IPv6 Capable	IPv6 Preferred	Samples	Weight	Weighted Samples
KZ	Kazakhstan	0.01%	0.01%	3,940,578	0.75	2,941,992
KG	Kyrgyzstan	0.01%	0.01%	415,891	1.45	604,401
TJ	Tajikistan	0.01%	0.01%	178,947	2.73	487,894
TM	Turkmenistan	0.01%	0.01%	139,656	1.74	243,069
UZ	Uzbekistan	0.01%	0.01%	672,486	7.03	4,728,729

Source: https://stats.labs.apnic.net/ipv6/XR

Some measurement data from CAREN

CAREN

Overall CAREN Traffic Graphs for February 2018

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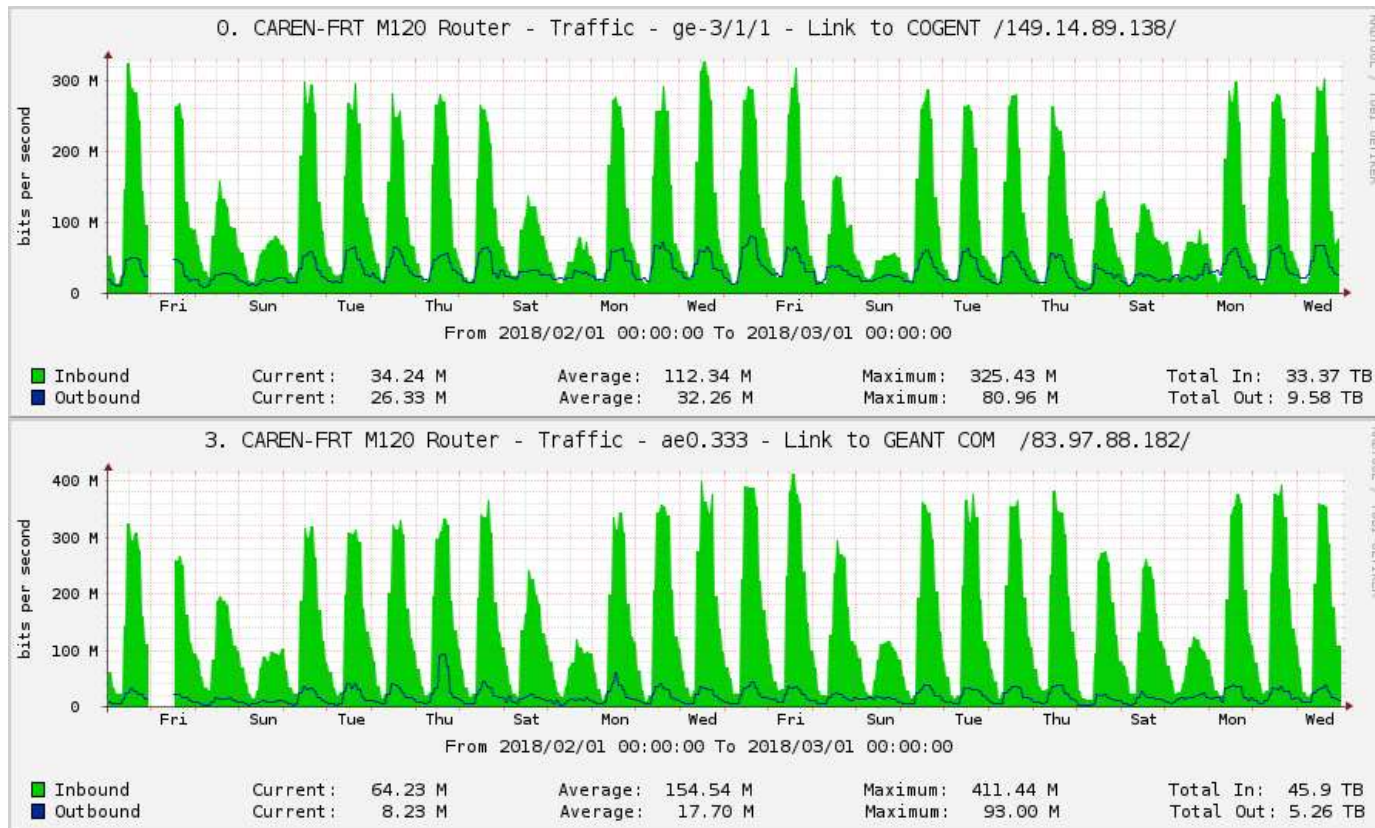
Some measurement data from CAREN

Overall CAREN Research Traffic Graphs for February 2018
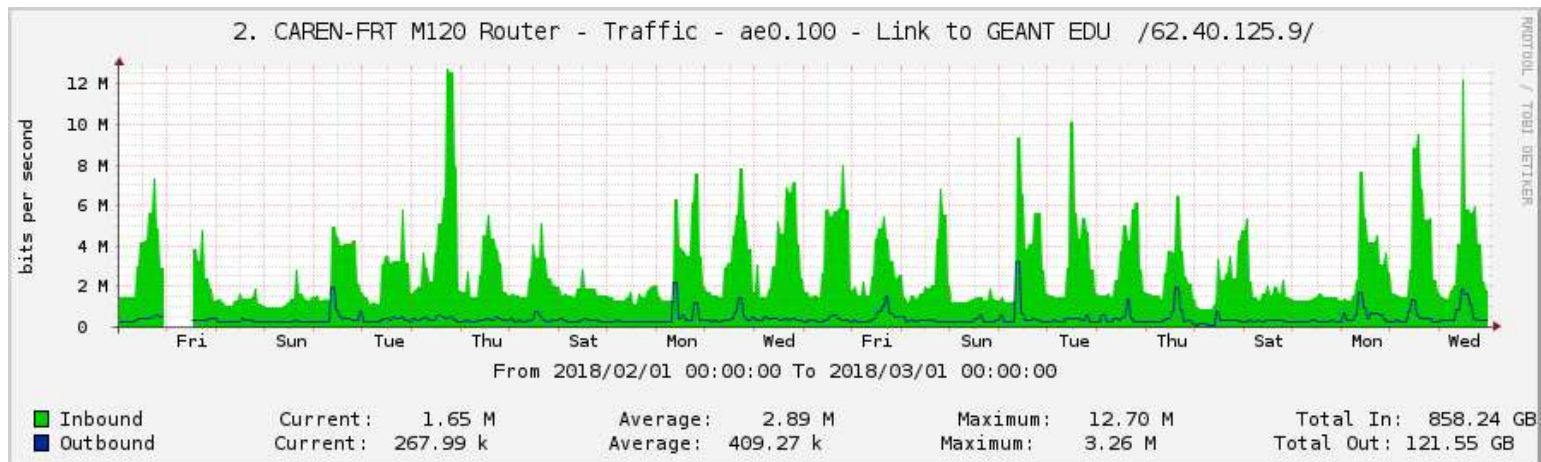
Results of Netflow collection for KRENA

KRENA Top 10 source and destination

- GOOGLE - Google LLC — 34.7%
- FACEBOOK - Facebook — 18.6%
- MAILRU-AS - Limited liability company Mail.Ru — 12.3%
- MICROSOFT-CORP-MSN-AS-BLOCK - Microsoft Corporation — 10.1%
- GEANT_IAS_VRF - GEANT Limited — 8.5%
- AMAZON-02 - Amazon.com
- VKONTAKTE-SPB-AS - VKontakte Ltd
- EDGECAST - MCI Communications Services
- AKAMAI-ASN1 - Akamai International B.V.
- LEVEL3 - Level 3 Parent
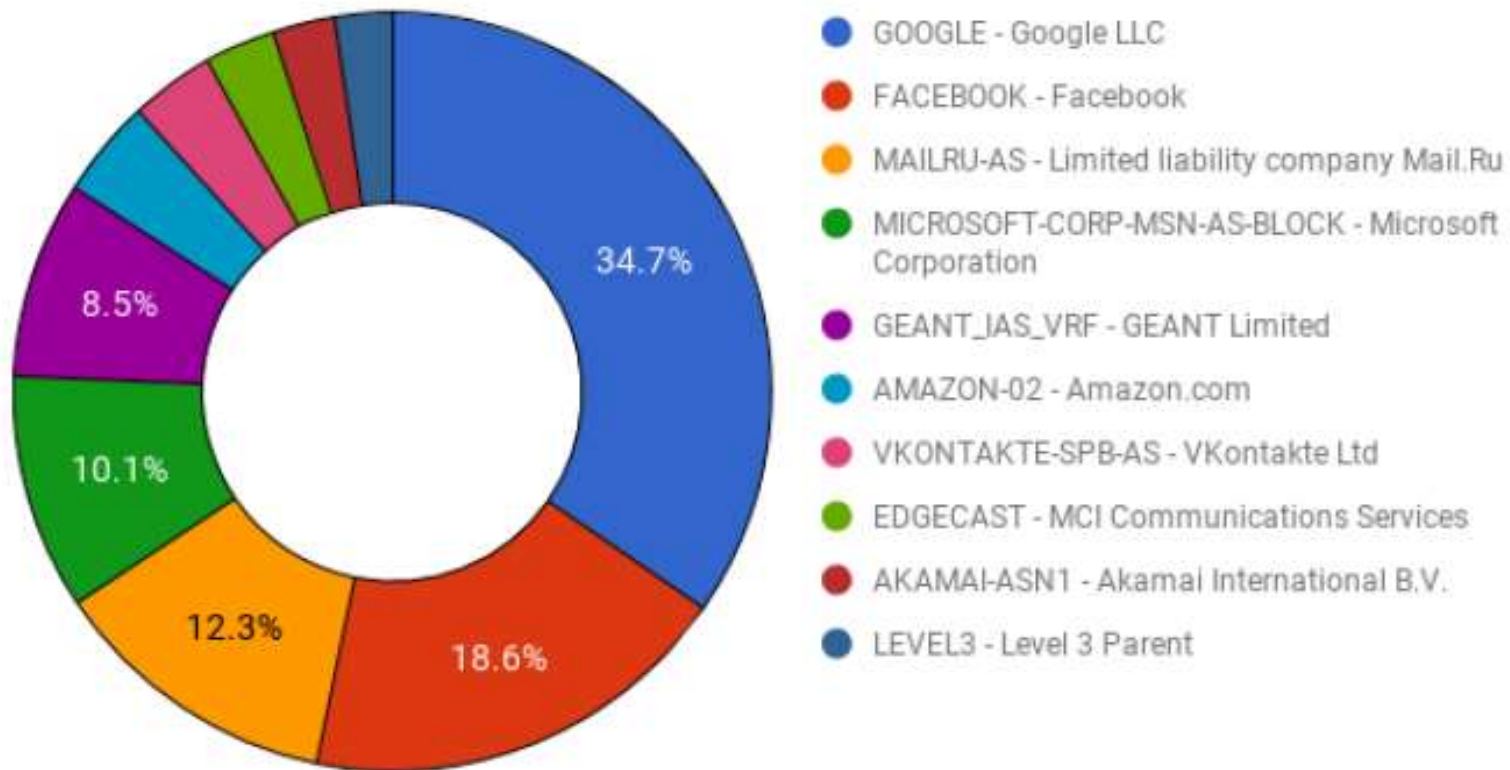
Results of Netflow collection for TARENA

TARENA's TOP 10 source and destination

- GOOGLE - Google LLC — 40.1%
- YOUTUBE - Google LLC — 24.8%
- MAILRU-AS - Limited liability company Mail.Ru — 6.1%
- DIGITALOCEAN-ASN - DigitalOcean — 6.0%
- FACEBOOK - Facebook — 5.8%
- AKAMAI-ASN1 - Akamai International B.V.
- MICROSOFT-CORP-MSN-AS-BLOCK - Microsoft Corporation
- ROSTELECOM-AS - PJSC Rostelecom
- AMAZON-02 - Amazon.com
- YANDEX - YANDEX LLC
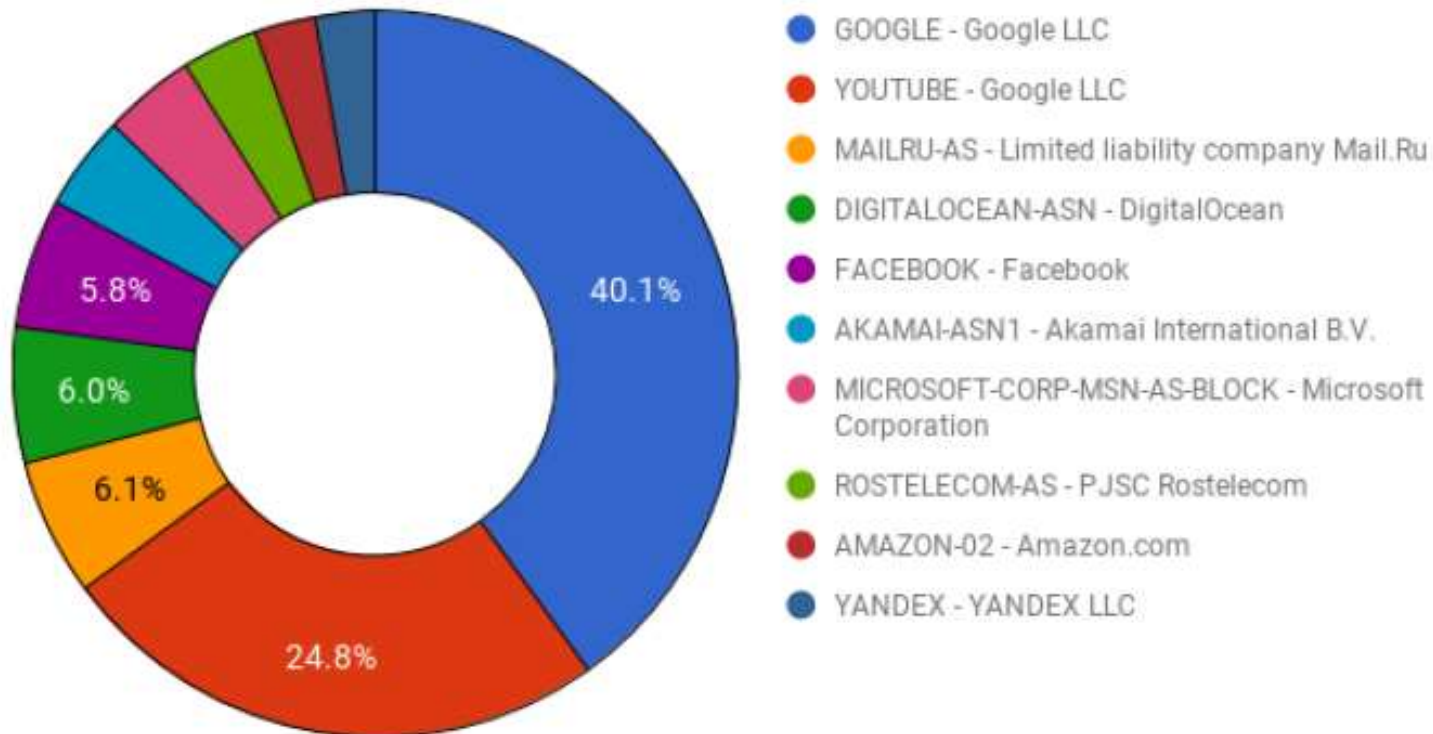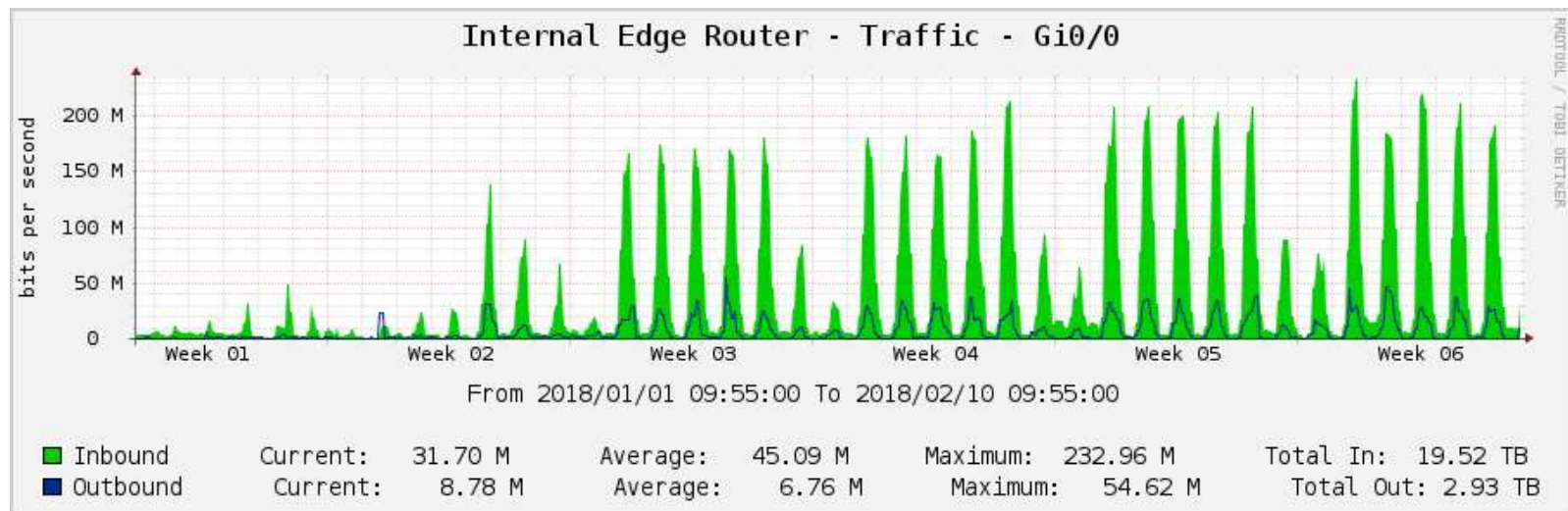
American University of Central Asia

Some measurement data from AUCA

AUCA Edge Router Traffic
Period: October2017 - January2018
This graph represents overall internet traffic usage details separated into inbound and outbound traffic.

Internal Edge Router - Traffic - Gi0/0

From 2018/01/01 09:55:00 To 2018/02/10 09:55:00

		Current:		Average:		Maximum:		Total In:	
■ Inbound		31.70 M		45.09 M		232.96 M		19.52 TB	
■ Outbound		8.78 M		6.76 M		54.62 M		Total Out: 2.93 TB	

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CAREN and RIPE NCC cooperation

- Membership

- Internet measurement and data analysis (Atlas probes, etc) development

- University curricula integration (credits for online courses)