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Updates of CERNET

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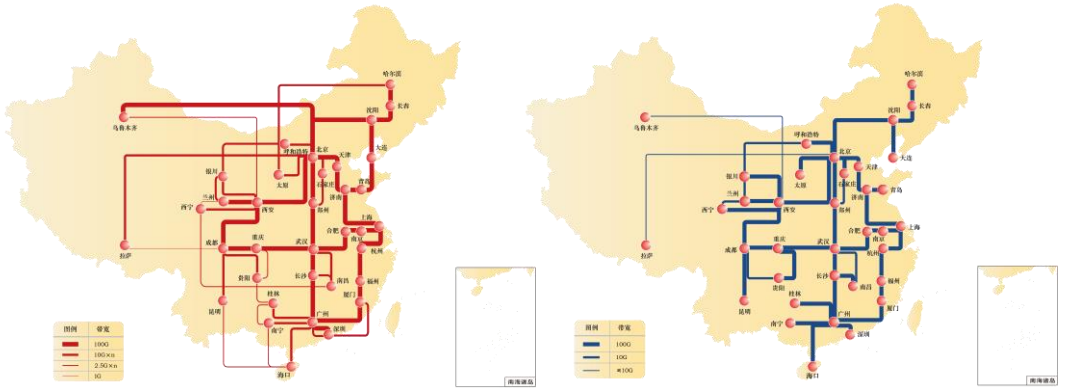
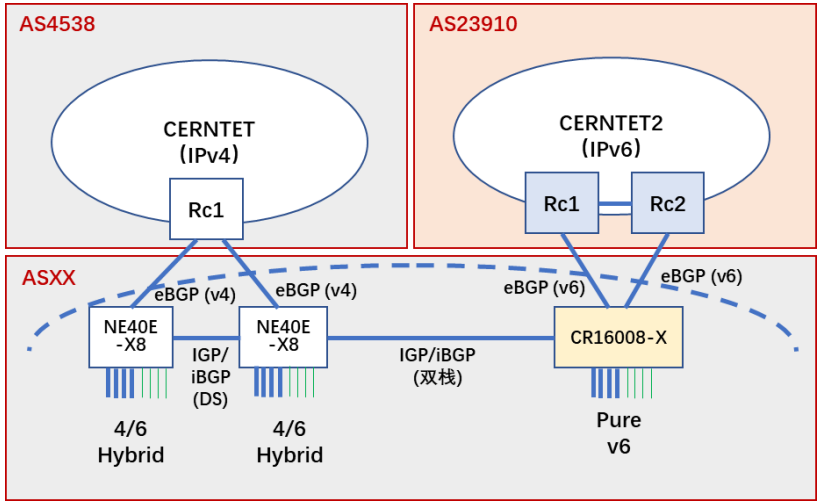
Contents

- **CERNET**

Backbone

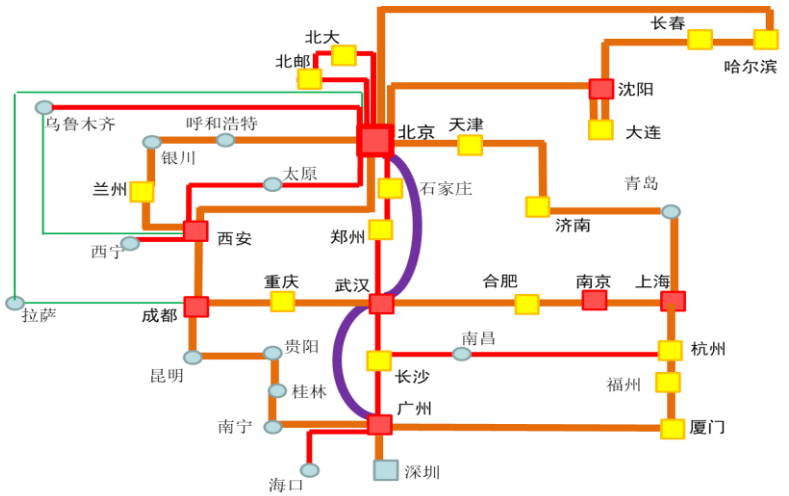
- **Optical transmission backbone**
  - 32,000km dark fiber
- **Two IP backbones**
  - CERNET (AS4538): Pure IPv4 (since 1994)
  - CERNET2 (AS23910): Pure IPv6 (since 2004)
- **41 PoPs with unified access node**
  - One AS for each PoP
- **100G/400G backbone links**
- **2000+ Universities & Research Institutes**
- **20M end users**



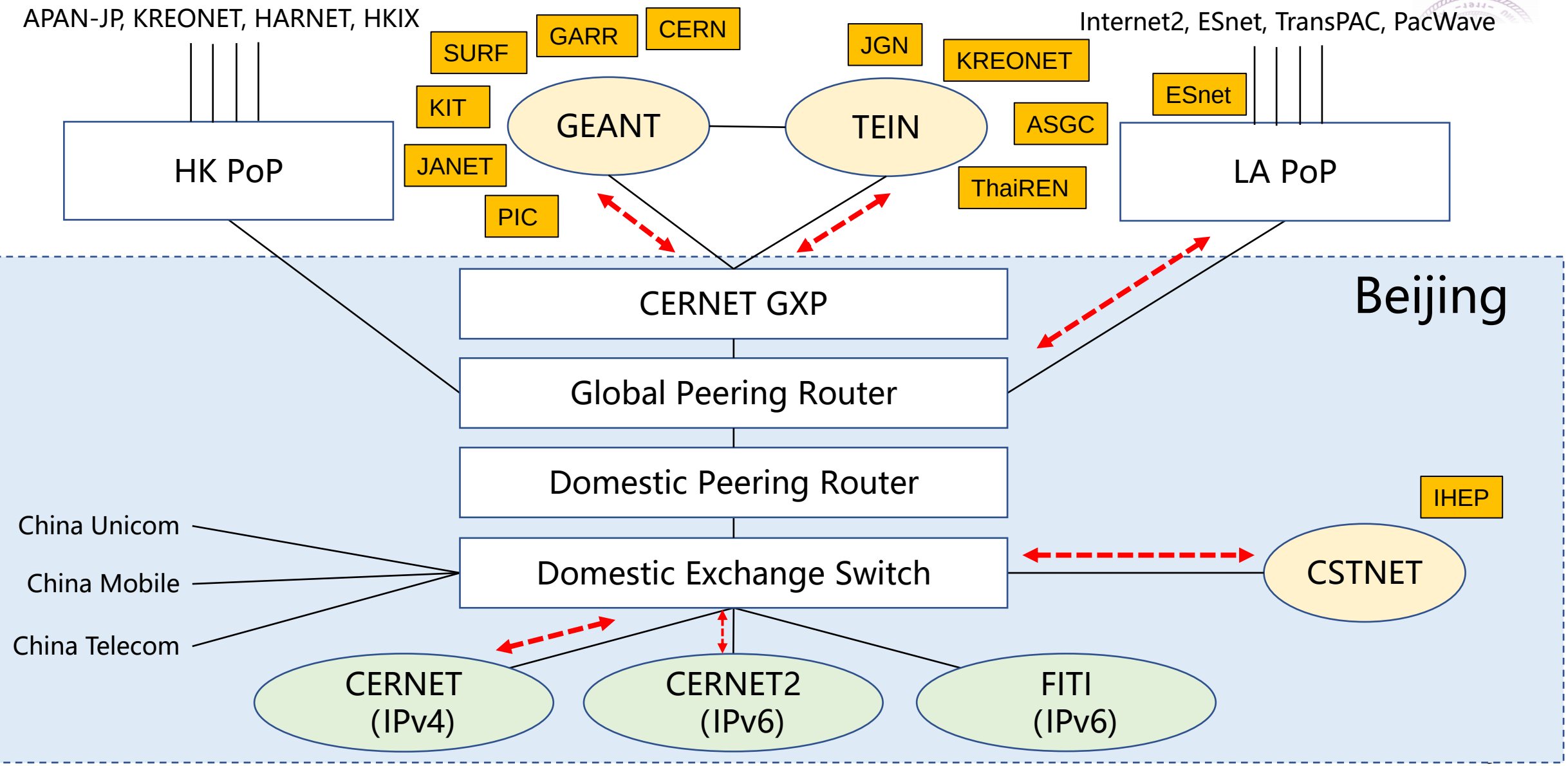


Upgrade project

- **Optical transmission backbone**
  - 2023: 17,000km
  - 2024: 15,000km
- **IP backbone**
  - Upgrade for CERNET is underway, which is supposed to be all ready for Terabit connection in the near future
  - Upgrade for CERNET2 is under preparation



LHCONE L3VPN peering



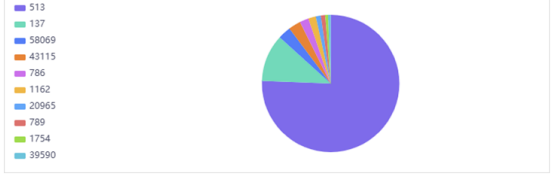
LHCONE traffic Top 10 over CERNET-GEANT link

(1 Mar 2024 – 31 Aug 2024)

GEANT → CERNET

Top 10 As on Router [redacted] by octs src

	As	PKTS SRC	PKTS DST	OCTS SRC	OCTS DST
CERN	513	628.9M	1	818.2G	74
GARR	137	88.5M	1	120.3G	74
KIT	58069	37.1M	7	33.0G	4.0K
PIC	43115	26.7M	1	31.1G	74
JANET	786	29.9M	1	22.8G	1.2K
SURF	1162	75.0M	15	19.3G	9.4K
	20965	1.5M	0	12.8G	0
	789	8.5M	4	11.0G	1.5K
	1754	5.5M	4	7.3G	3.8K
	39590	1.4M	0	6.4G	0



Top 10 AS sorted by src address

Top 10 As on Router [redacted] by octs dst

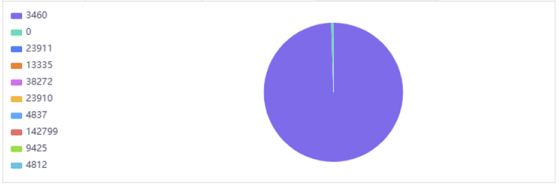
	As	PKTS SRC	PKTS DST	OCTS SRC	OCTS DST
IHEP	3460	0	911.7M	0	1.1T
	38272	12	41	968	49.0K
	0	13.0K	168	13.9M	15.9K
	1162	75.0M	15	19.3G	9.4K
	35296	205.2K	9	298.2M	4.1K
	58069	37.1M	7	33.0G	4.0K
	1754	5.5M	4	7.3G	3.8K
	2091	1.9M	3	1.7G	2.5K
	789	8.5M	4	11.0G	1.5K
	142801	0	1	0	1.3K

Top 10 AS sorted by dest address

CERNET → GEANT

Top 10 As on Router [redacted] by octs src

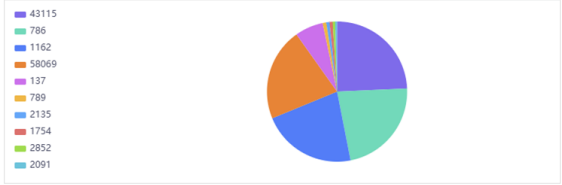
	As	PKTS SRC	PKTS DST	OCTS SRC	OCTS DST
IHEP	3460	1.4G	0	1.9T	0
	0	7.4M	164	10.2G	15.6K
	23911	1.6K	0	156.3K	0
	13335	4	0	5.5K	0
	38272	12	11	956	6.2K
	23910	3	5	376	576
	4837	2	0	192	0
	142799	2	0	144	0
	9425	1	0	136	0
	4812	1	0	96	0



Top 10 AS sorted by src address

Top 10 As on Router [redacted] by octs dst

	As	PKTS SRC	PKTS DST	OCTS SRC	OCTS DST
PIC	43115	0	314.5M	0	475.0G
JANET	786	0	322.4M	0	442.4G
SURF	1162	0	316.2M	0	427.7G
KIT	58069	0	308.1M	0	418.2G
GARR	137	0	99.8M	0	127.7G
IN2P3	789	0	12.3M	0	16.4G
	2135	0	10.4M	0	14.4G
	1754	0	10.8M	0	13.8G
	2852	0	8.2M	0	11.5G
	2091	0	6.2M	0	8.5G



Top 10 AS sorted by dest address

LHCONE traffic Top 10 over CERNET-TEIN link

(1 Mar 2024 – 31 Aug 2024)

TEIN → CERNET

Top 10 As on Router [redacted] by octs src

	As	PKTS SRC	PKTS DST	OCTS SRC	OCTS DST
FNAL	3152	39.0M	21	49.4G	3.0K
UCSD	26397	15.1M	49	21.0G	60.6K
WISC	59	18.4M	52	21.0G	64.3K
UltraLight	32361	16.5M	0	17.3G	0
BNL	43	17.3M	81	14.5G	76.1K
KEK	2505	8.4M	63	11.3G	32.5K
	7896	7.7M	0	10.9G	0
	3	5.6M	52	7.6G	64.3K
	7212	5.5M	63	7.1G	77.9K
	2501	5.9M	75	6.0G	53.1K

Top 10 AS sorted by src address

Top 10 As on Router [redacted] by octs dst

	As	PKTS SRC	PKTS DST	OCTS SRC	OCTS DST
IHEP	3460	0	150.7M	0	177.9G
	0	818.8K	3.9K	1.0G	385.7K
	7212	5.5M	63	7.1G	77.9K
	43	17.3M	81	14.5G	76.1K
	59	18.4M	52	21.0G	64.3K
	3	5.6M	52	7.6G	64.3K
	26397	15.1M	49	21.0G	60.6K
	2501	5.9M	75	6.0G	53.1K
	2505	8.4M	63	11.3G	32.5K
	160	2.7M	26	2.8G	32.1K

Top 10 AS sorted by dest address

CERNET → TEIN

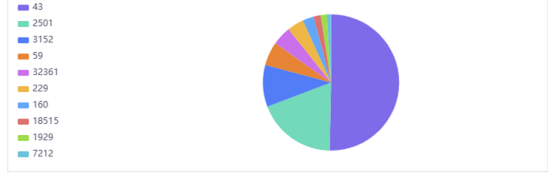
Top 10 As on Router [redacted] by octs src

	As	PKTS SRC	PKTS DST	OCTS SRC	OCTS DST
IHEP	3460	277.7M	0	379.7G	0
	0	9.4K	3.5K	2.5M	348.2K
	23911	1.1K	0	903.9K	0
	23910	10	4	927	272
	38272	2	2	307	295
	24444	1	0	96	0
	1764	1	0	76	0
	43	0	134.3M	0	188.5G
	2501	0	50.3M	0	70.7G
	3152	0	28.2M	0	37.2G

Top 10 AS sorted by src address

Top 10 As on Router [redacted] by octs dst

	As	PKTS SRC	PKTS DST	OCTS SRC	OCTS DST
BNL	43	0	134.3M	0	188.5G
University of Tokyo	2501	0	50.3M	0	70.7G
FNAL	3152	0	28.2M	0	37.2G
WISC	59	0	15.8M	0	21.0G
UltraLight	32361	0	12.7M	0	16.9G
MERIT	229	0	10.8M	0	14.8G
	160	0	7.4M	0	9.9G
	18515	0	4.5M	0	6.3G
	1929	0	3.9M	0	5.4G
	7212	0	3.1M	0	3.8G



Top 10 AS sorted by dest address

Future plan for LHCONE

- **Extending LHCONE L3VPN to LHCONE participants in CERNET, e.g. faculty or lab in university**
  - User research by CERNET team
    - Tsinghua University, Peking University, Lanzhou University, Central China Normal University etc.
  - Challenge
    - Policy of campus network: L3VPN deployment (dedicated link from LHCONE participant to CERNET backbone?)
    - Bandwidth: LHCONE burst traffic vs. campus customer traffic
- **Extending LHCONE peering with international partners**

Thanks!

Looking forward to collaboration with domestic and global partners on LHCONE and future Internet technology