Internet speed evolution from the HiPS network's point of view

IVOA meeting – October 2021

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Observatoire astronomique de Strasbourg | ObAS

IVOA

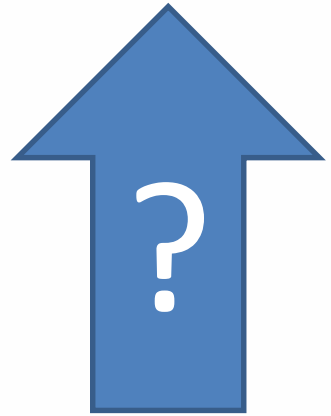
« The big question »

“Without Internet, no VO”

What is the pipe diameter?

Rules of the game & vocabulary

1. For several years the astronomical community has been using the **Aladin Desktop** client tool to visualize progressive **sky surveys** (HiPS).
   These HiPS are distributed by a **collection of servers** (HiPS nodes) spread around the world.
2. The most used HiPS are duplicated on several servers and each Aladin Desktop session **automatically selects one fast site**.
3. Based on the Aladin Desktop **logs**, we obtain an **evolving matrix of the global connection** between the hundreds of thousands of client sessions and the dozens of servers around the world



APACHE HTTP SERVER

Measurement bias

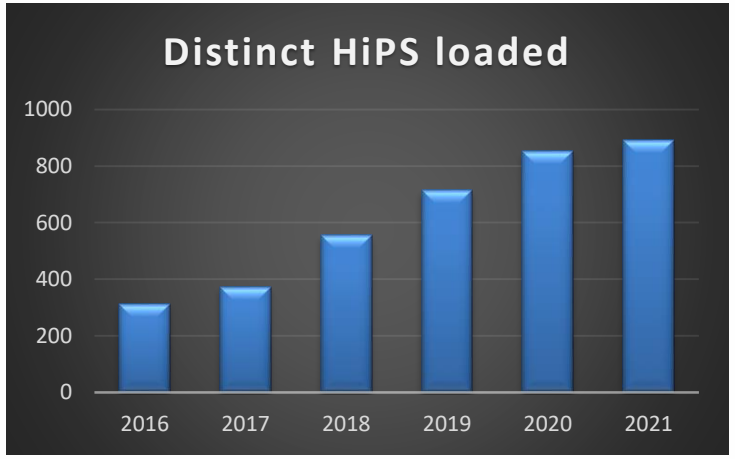
1. **Only Aladin Desktop** (not Aladin Lite, and other HiPS clients such as WWT, DIGISTAR or Stellarium)
2. Only Aladin users who have **accepted the logs** (via preferences)
3. Operational measurements mixed with a few test measurements during trials and deployments of new HiPS

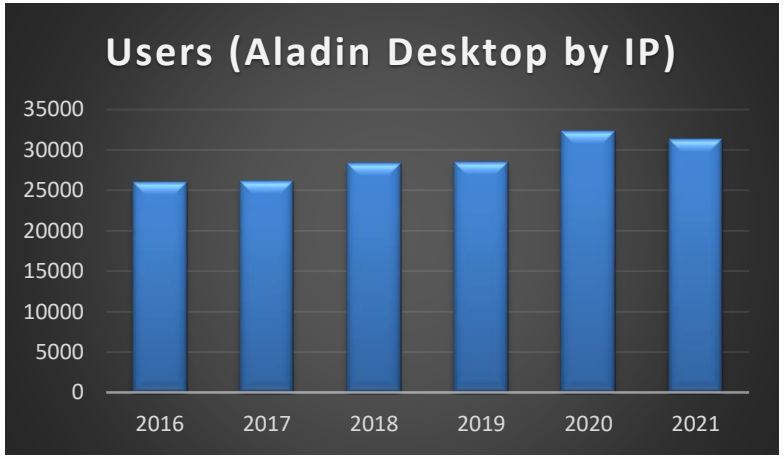
Figures…

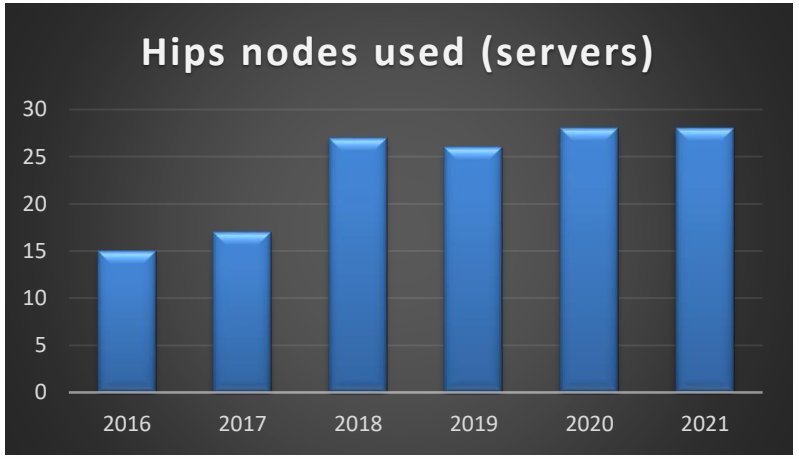
- From Jan 2016 to now
- 918 Aladin Desktop session per day
- **171,173 clients** based on unique IP
- **41 HiPS nodes** = HTTP servers (22 declared)
- 961 distinct HiPS used
- 9.7 TB downloaded
- **1,723,953 measurements** (=volume and speed from one user concerning one HiPS loaded from one HiPS node)

6 years HiPS network evolution

(seen by AladinDesktop eyes)







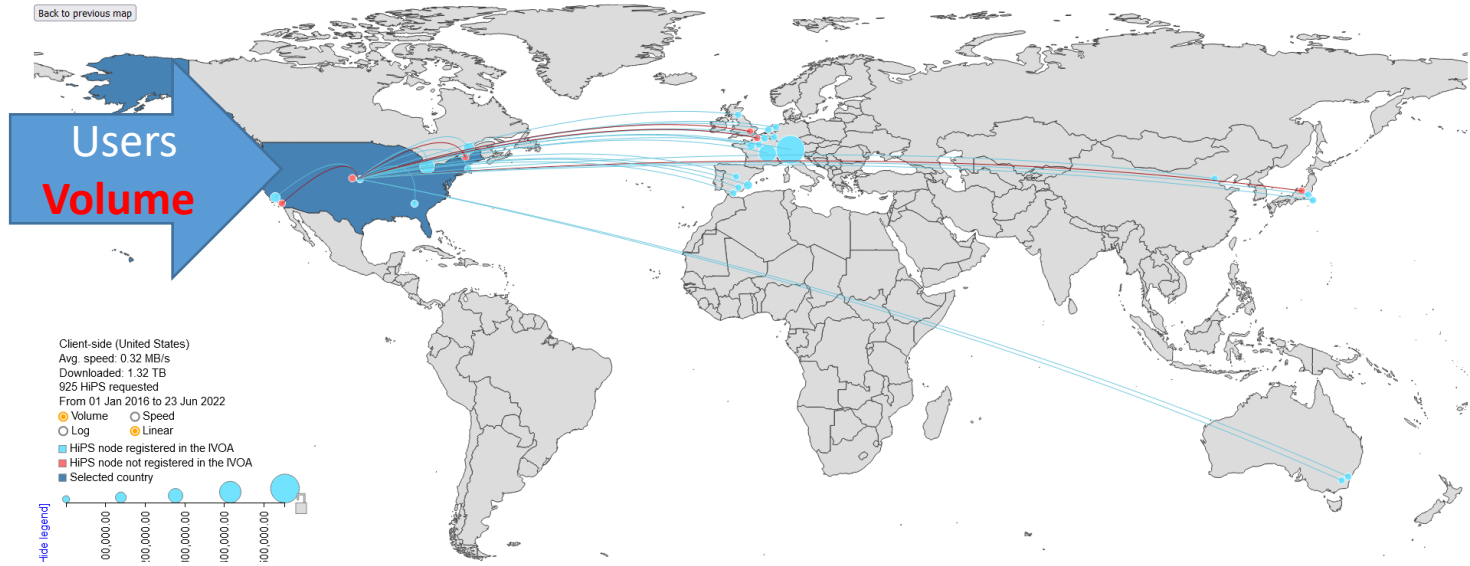
	HiPS
2016	312
2017	373
2018	554
2019	713
2020	852
2021	890

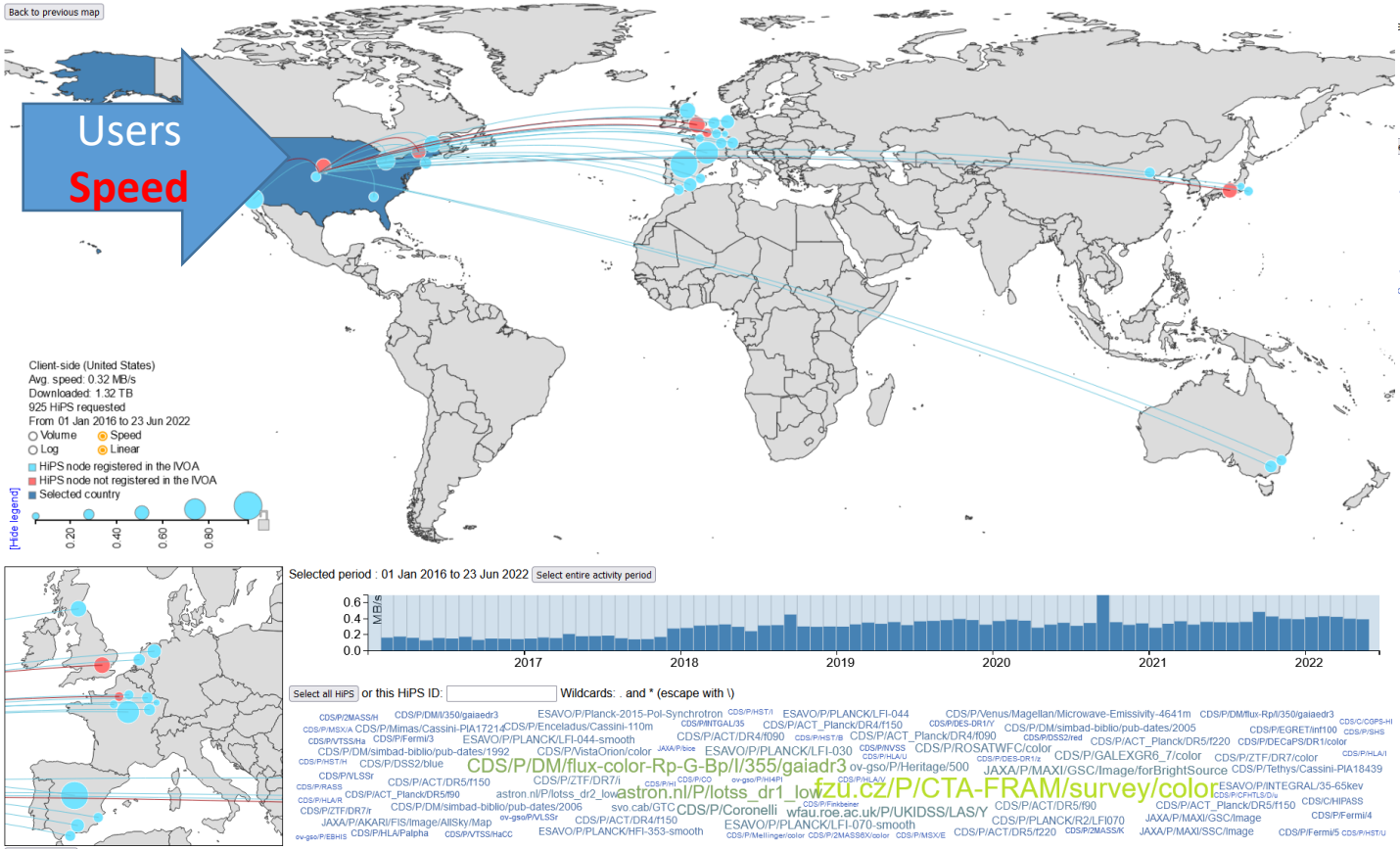
	Users
2016	26033
2017	26090
2018	28297
2019	28532
2020	32359
2021	31345

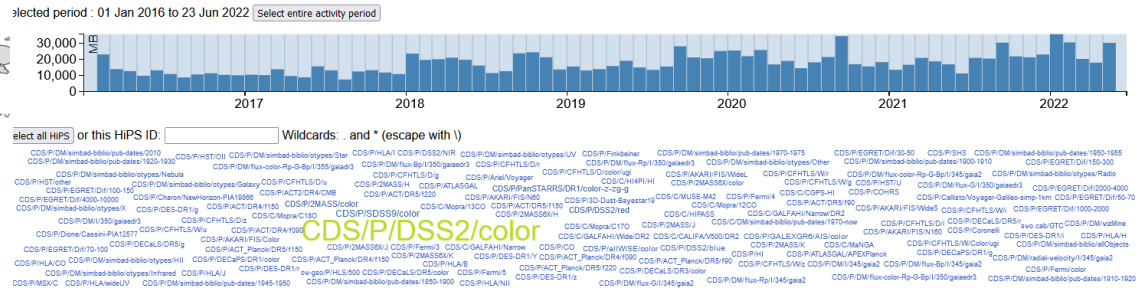
	Hips nodes
2016	15
2017	17
2018	27
2019	26
2020	28
2021	28

A) Country measures
= Users point of view

Volume or Speed



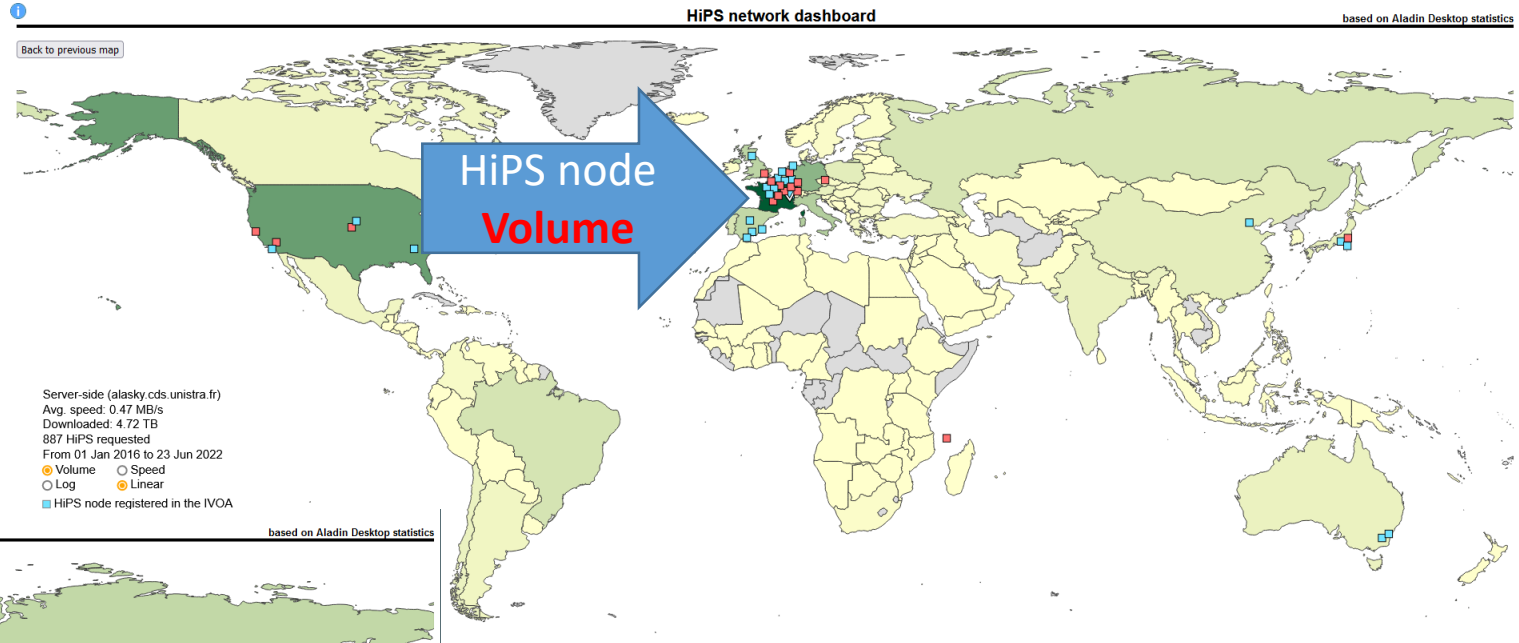


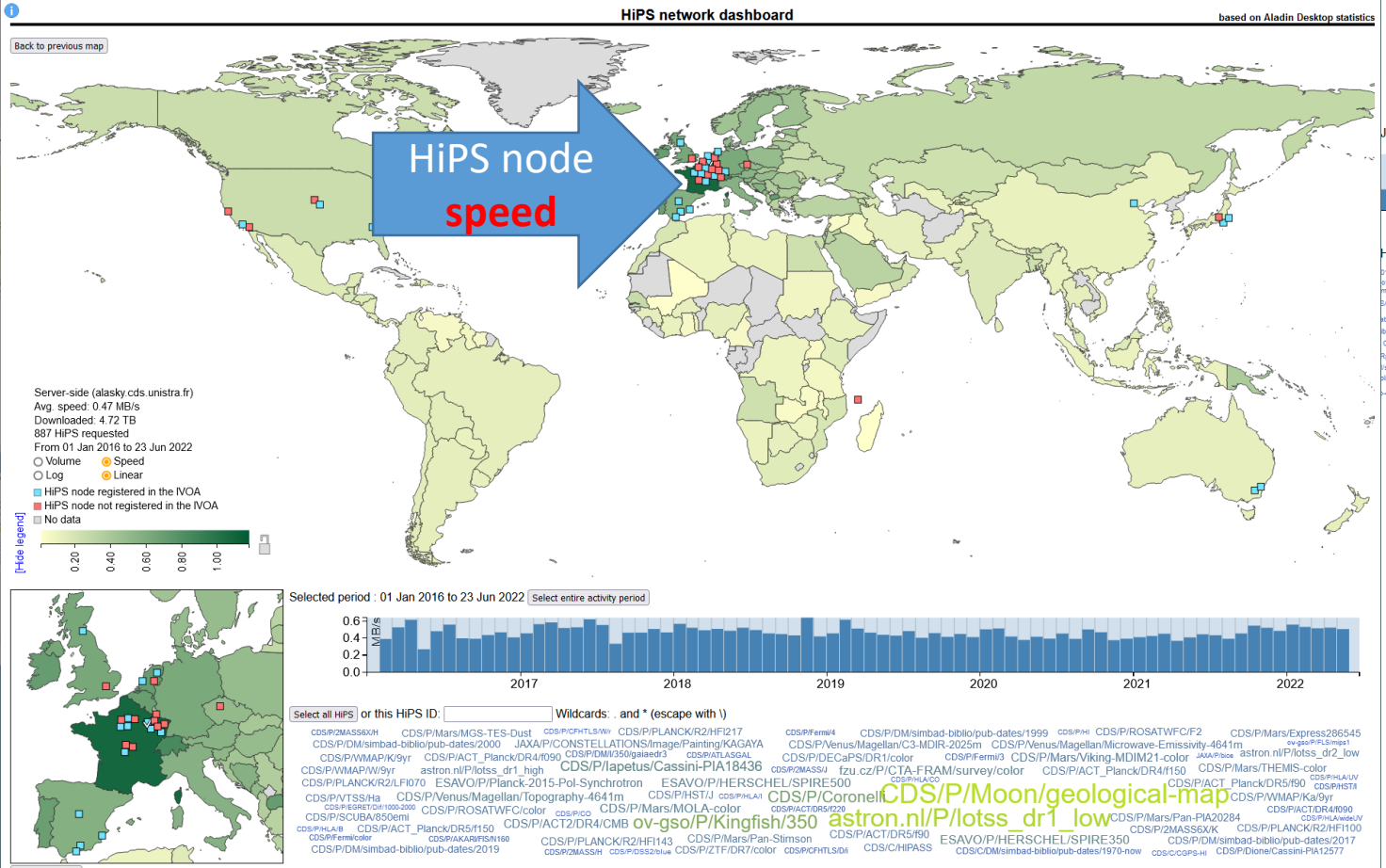


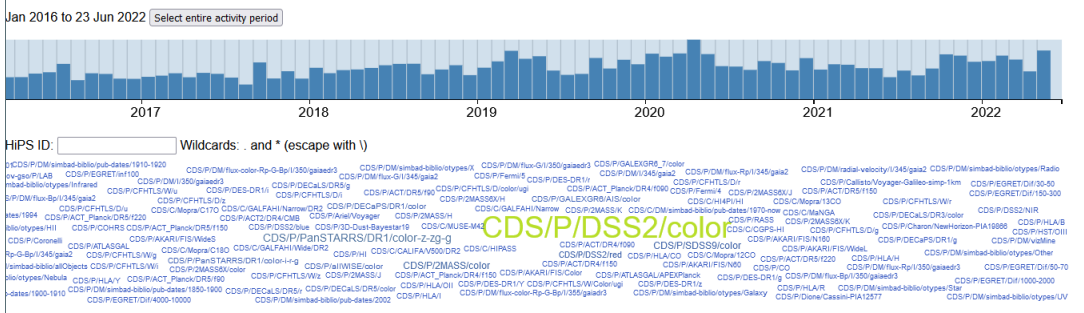
HiPS nodes selected by users from the same country, in volume or in speed

B) HiPS node measures = Server point of view

Volume & speed



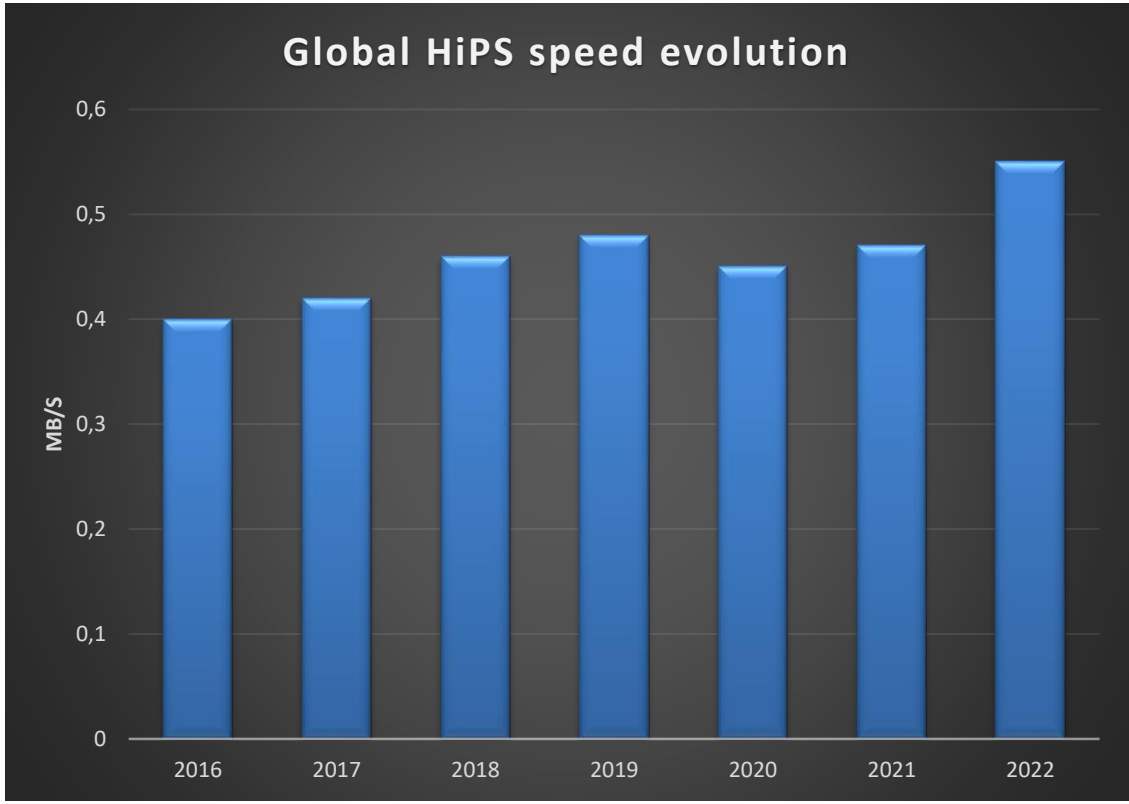




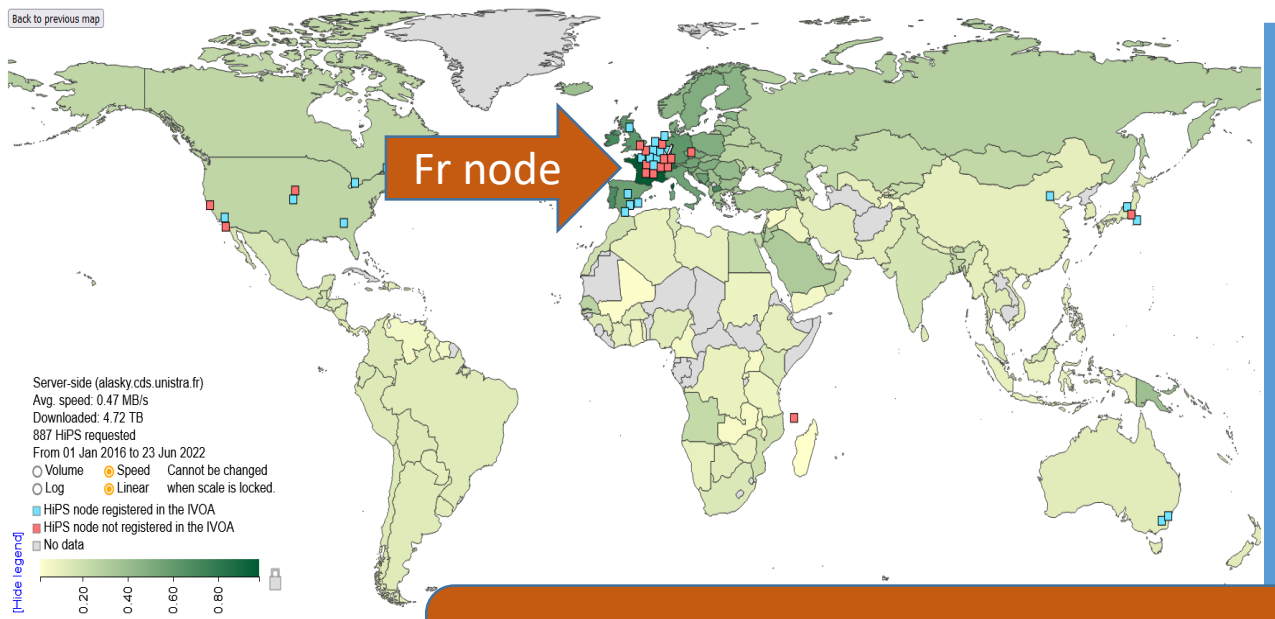
User throughput per country for a given HiPS node

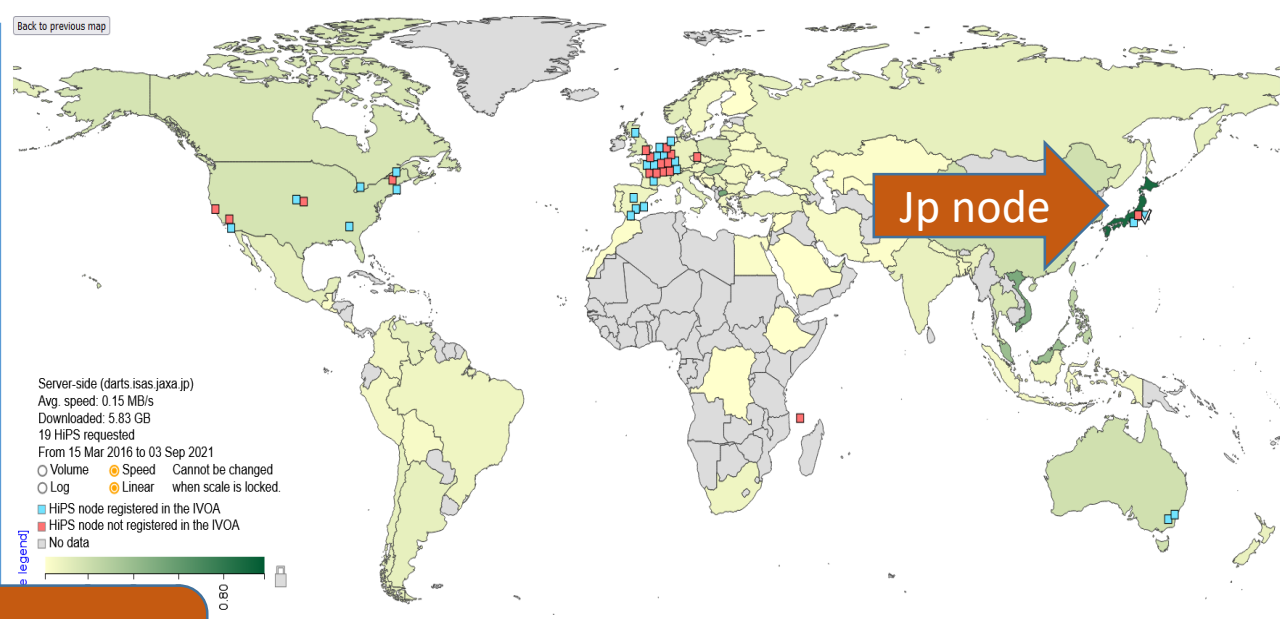
Global worldwide HiPS speed evolution
(all clients and servers considered)

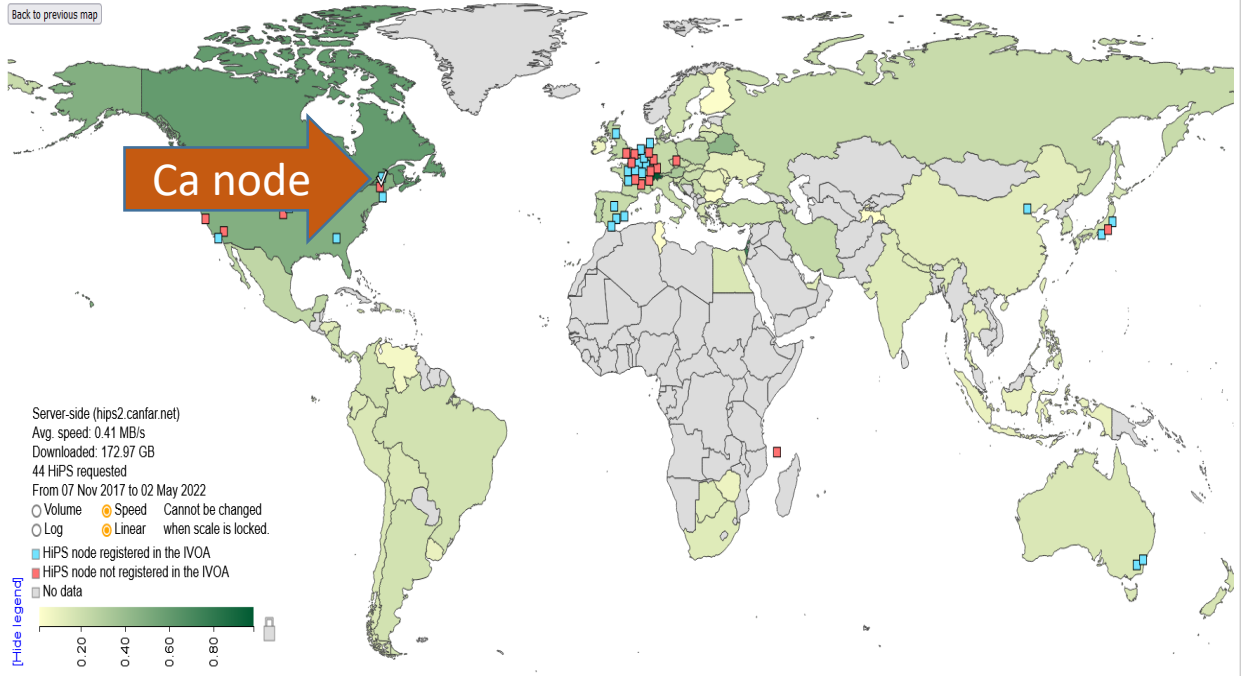
	MB/s
2016	0.40
2017	0.42
2018	0.46
2019	0.48
2020	0.45
2021	0.47
2022	0.55

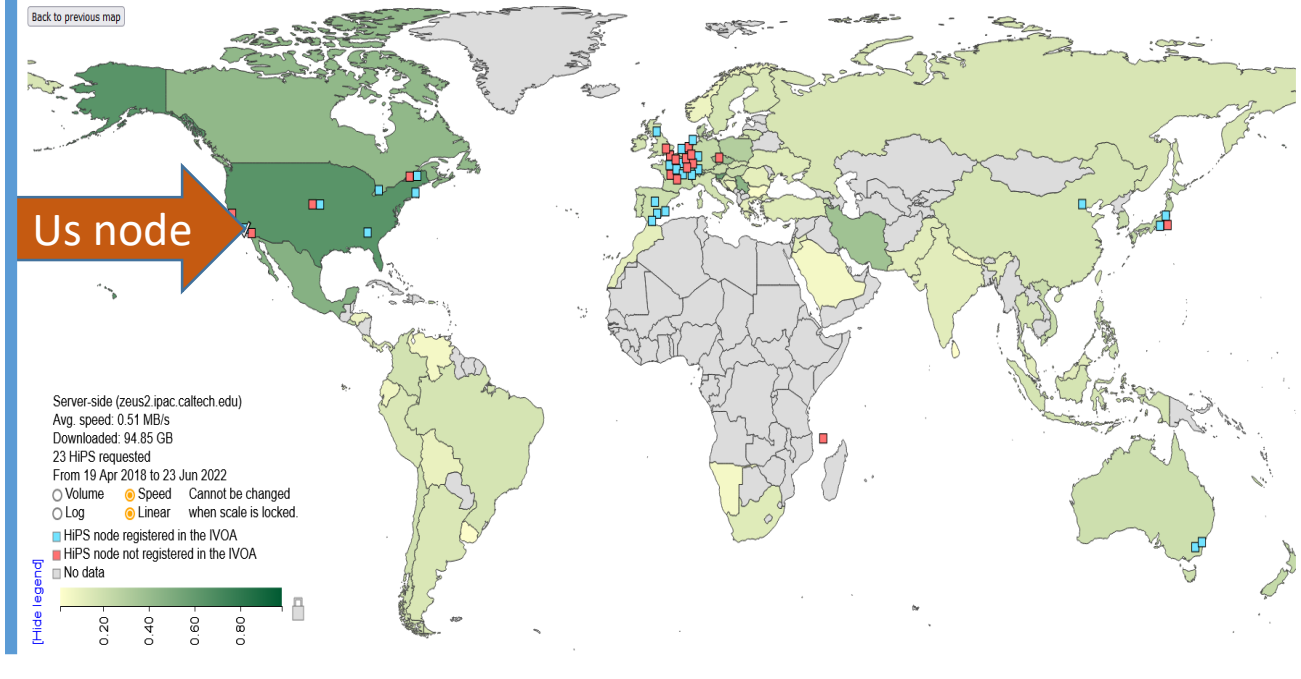


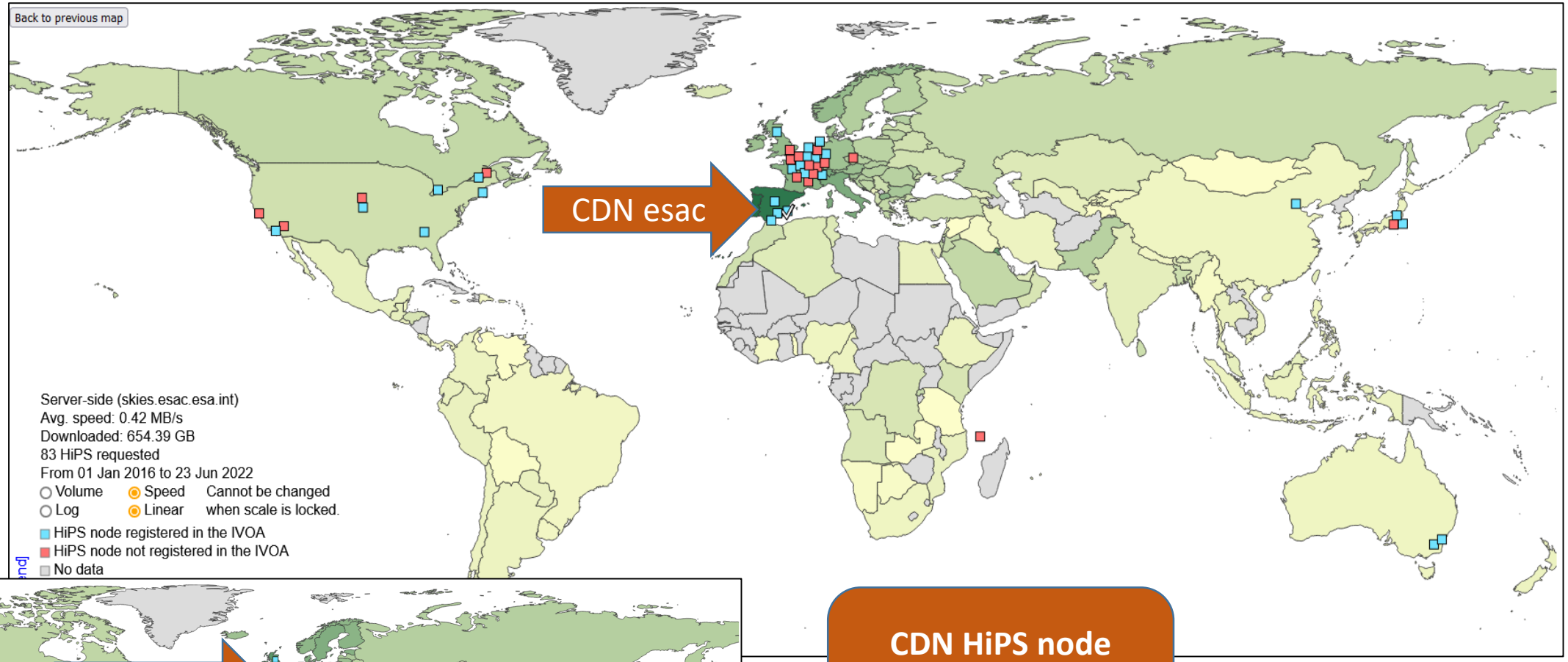
World wide server speeds comparison by HiPS node location

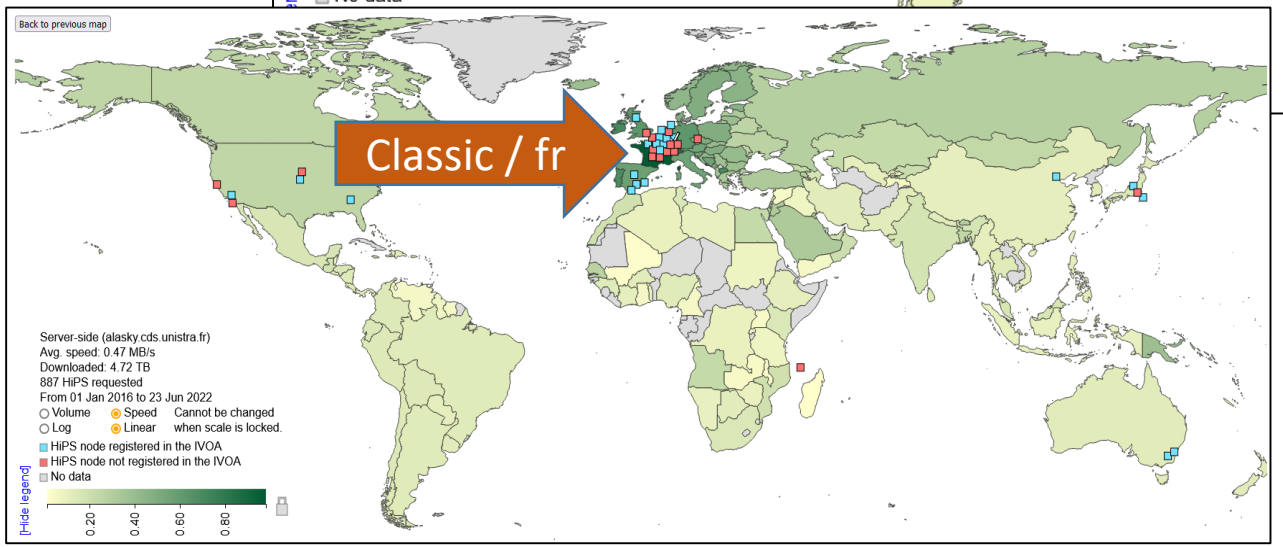










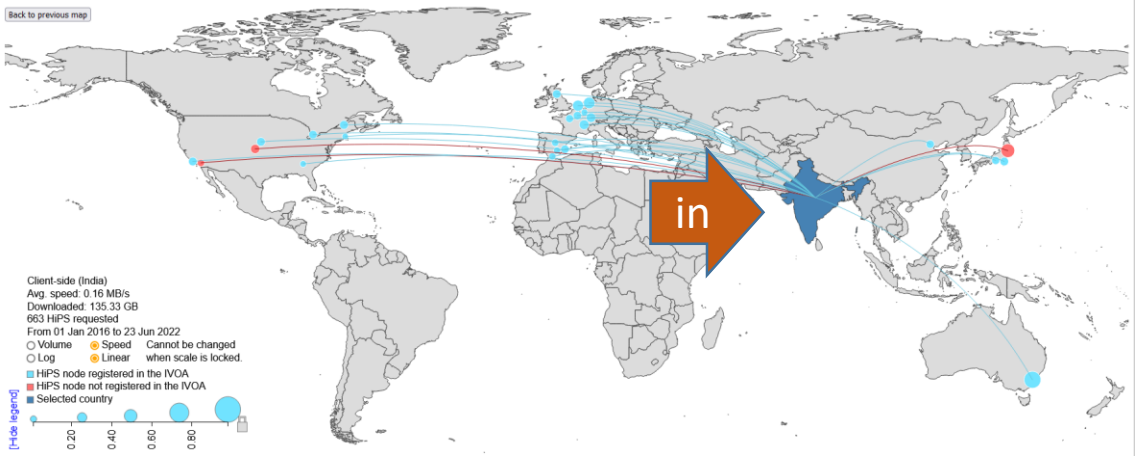


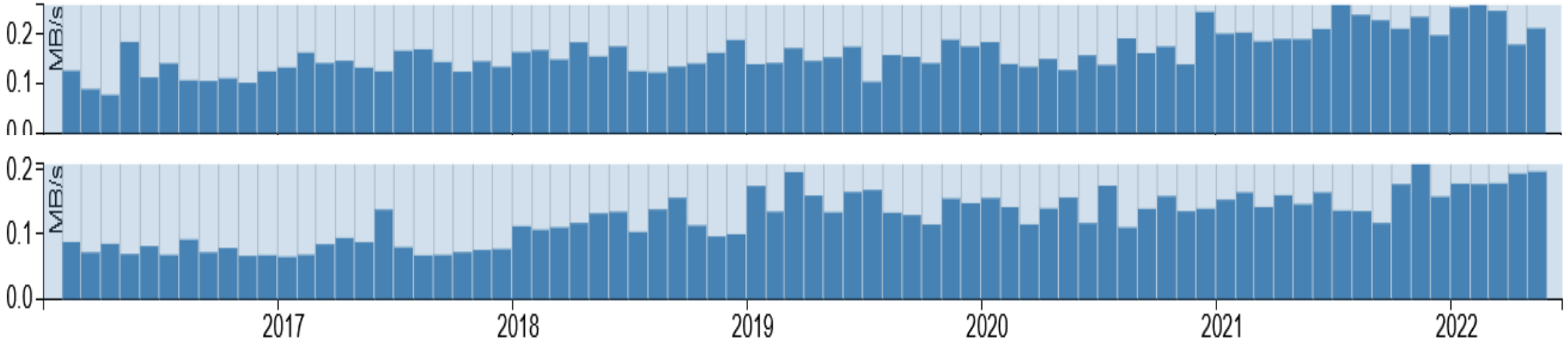
CDN HiPS node speed vs classic solution

Very similar result with or without CDN (= using world wide distributed proxy servers provided by an external company)

Global country speeds evolution

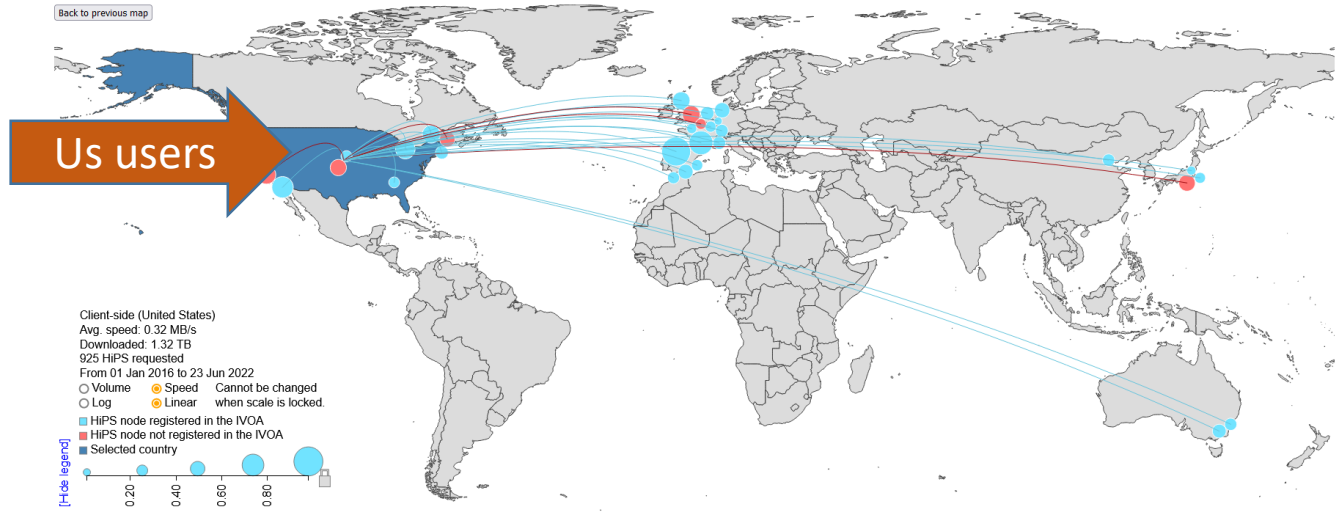
With no local HiPS node, => only net evolution impact

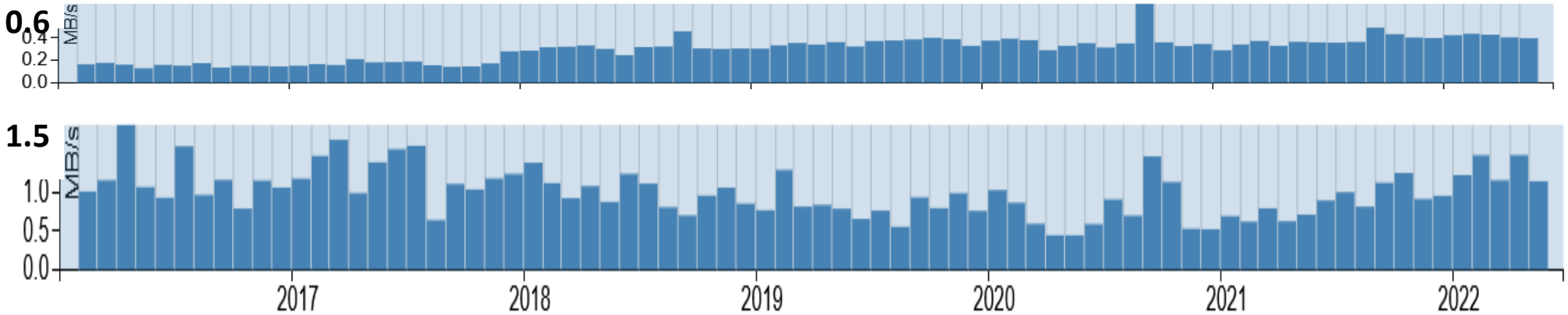


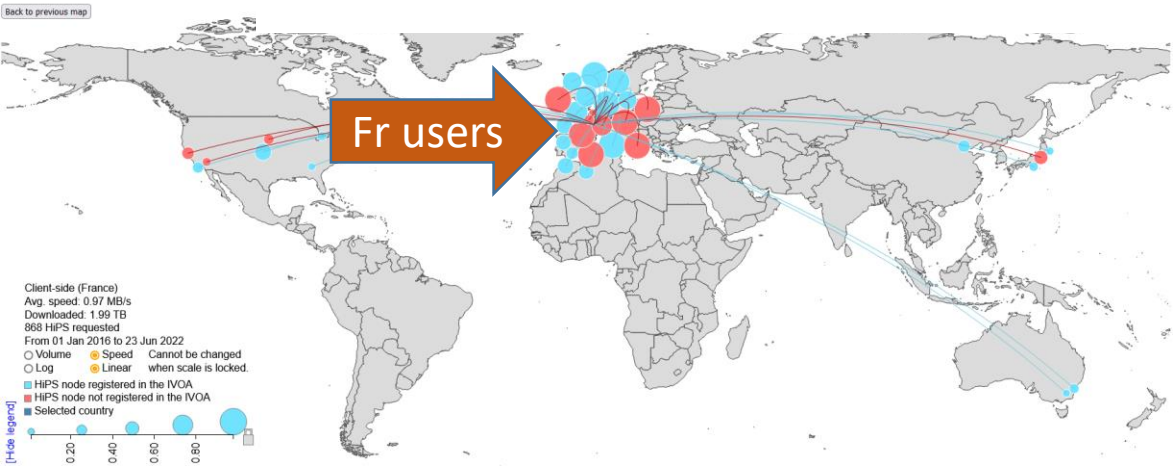


Speed impact of HiPS location

Very good net but a few HiPS cloned on local HiPS node
=> net evolution impact dominating

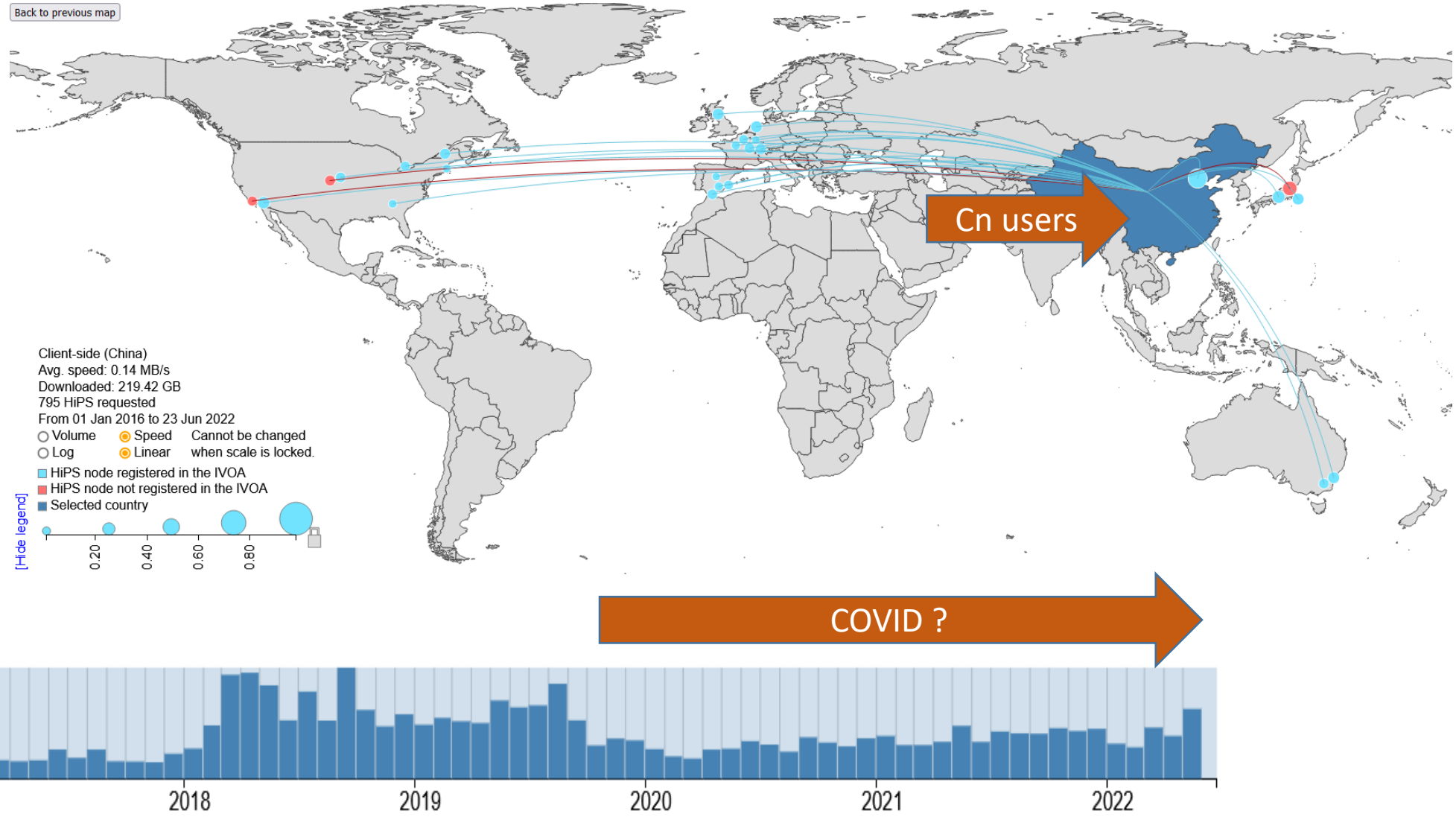






Very good net with all HiPS cloned on local HiPS node

World conjuncture speed impact



Highlights

- A mapping that reflects the **technological level of each country**
- A 7-year evolution of the bandwidth specific to each country
  - Strong and regular for “technical emerging” countries
  - Related to the global conjuncture (COVID, conflicts, ...)
- A mapping that also **highlights the countries' spheres of influence**
- **More HiPS nodes used than declared** (but for temporary usage)
- No real gain for the CDN solution vs. the traditional solution – (probably related to the CDN options selected/paid)
- A clearly **dominant European HiPS implantation**.
- An obvious benefit for users to have a **HiPS node "in their own country"** (or in their own network infrastructure – ex: Europe, North America…)

Thank you