

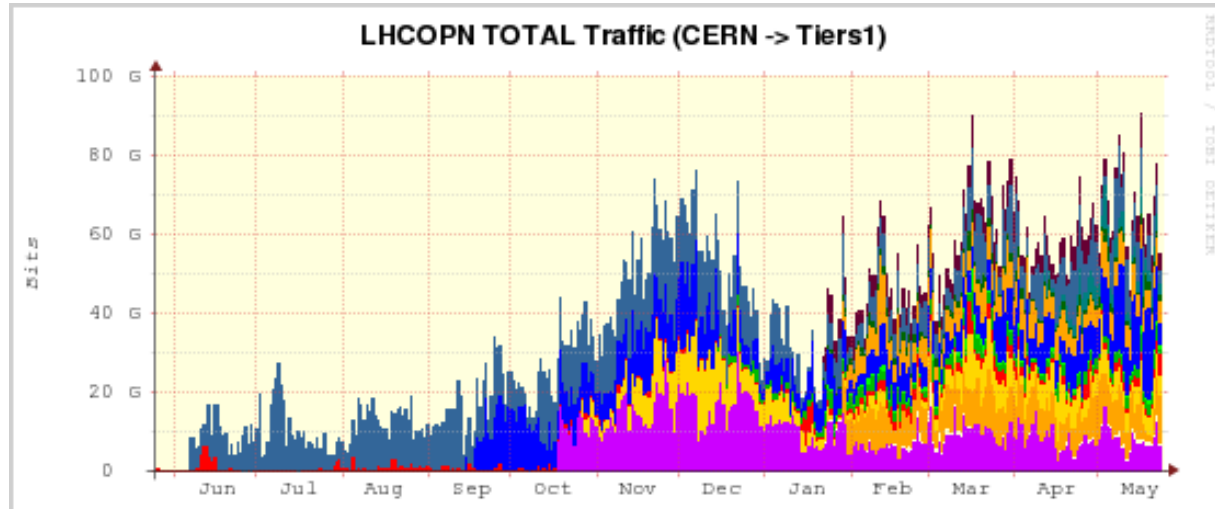


Notes on NOTED

Coralie Busse-Grawitz

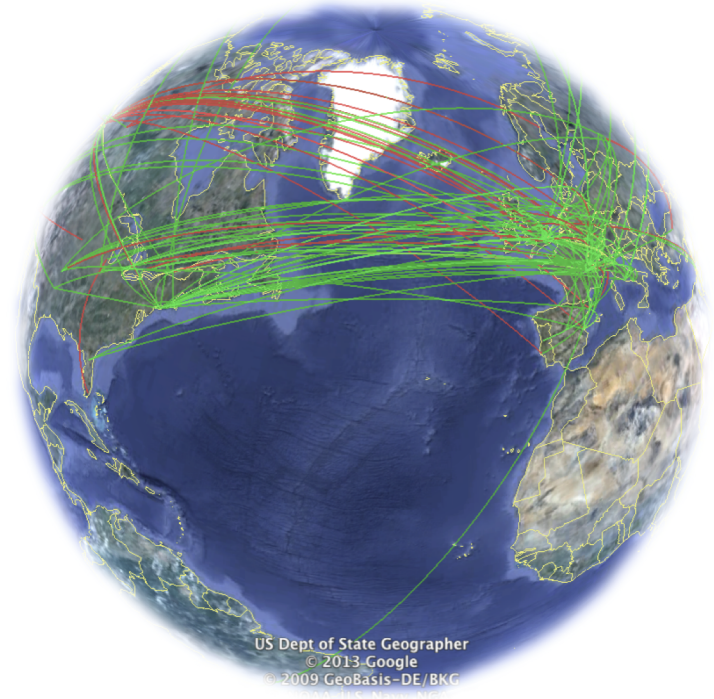
Supervisor: Edoardo Martelli

The luminosity upgrade causes higher bandwidth usage (peaks).



https://netstat.cern.ch/monitoring/network-statistics/ext/cache/LHCOPN_00-Total-Traffic-1-LHCOPN_TOTAL-OUT_Yearly.png

Smooth and large data transfers
need network optimization.



To optimize the file transfers,
we choose **data-driven actions**.

Data

Interface

Actions

To optimize the file transfers,
we anticipate the volume.

Data

Interface

Actions

#TB ∨ links

To optimize the file transfers,
we anticipate the volume.

Data

Interface

Actions

#TB \forall links

\Rightarrow need ...

... FTS info

... IP prefixes

To optimize the file transfers,
we show the volume estimations.

Data

#TB \forall links

\Rightarrow need ...

... FTS info

... IP prefixes

Interface

Human: Website

Machine: REST

Actions

To optimize the file transfers,
we act on the estimations.

Data

#TB \forall links

\Rightarrow need ...

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Interface

Human: Website

Machine: REST

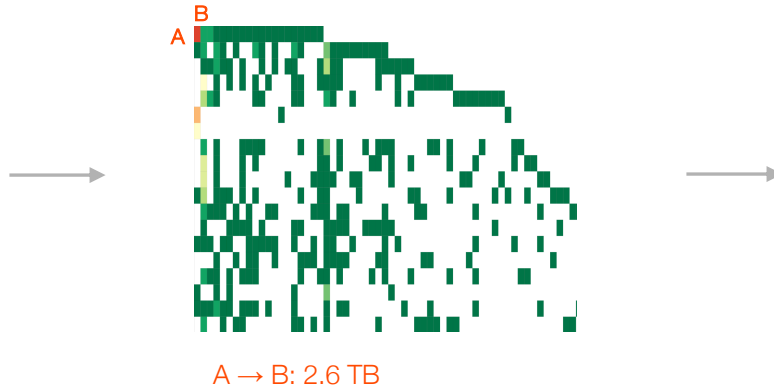
Actions

Manual

SDN

To optimize the file transfers, we choose data-driven actions.

```
{ "producer": "network", "type": "fts_ip_noted", "timestamp":  
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    "source_tier": "<source_tier>: str", "source_tier_level":  
      "<source_tier_level>: int", "source_ipv4_prefix":  
        "<source_ipv4_prefix>: str", "source_ipv6_prefix":  
          "<source_ipv6_prefix>: str", "source_ipv4_prefix_verified":  
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                                "<took>: int", "status": "<status>: int", "timed_out": "<timed_out>:  
                                  bool", "shards": { "total_shards": "<total>: int", "successful":  
                                    "<successful>: int", "skipped": "<skipped>: int", "failed": "<failed>: int"  
                                } }, "hits": {  
      "total_hits": "<total>: int", "max_score": "<max_score>: int" },  
      "idb_tags": {  
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        "source_tier_level", "source_ipv4_prefix", "source_ipv6_prefix",  
        "source_ipv4_prefix_verified", "source_ipv6_prefix_verified",  
        "dest_SE", "dest_tier", "dest_tier_level", "dest_ipv4_prefix",  
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          "dest_tier_level", "timestamp", "source_ipv4_prefix",  
          "source_ipv6_prefix", "source_ipv4_prefix_verified",  
          "source_ipv6_prefix_verified", "dest_ipv4_prefix", "dest_ipv6_prefix",  
          "dest_ipv4_prefix_verified", "dest_ipv6_prefix_verified",  
          "total_shards", "successful", "skipped", "failed", "total_hits",  
          "max_score" } }  
    }
```



Optimize

A: 2001:948:40::/42



B: 2a00:139c::/45

TODO: adapt next slides

We have successfully
deployed a manual test.

CERN-NLT1 load balancing over LHCOPN and LHCONE

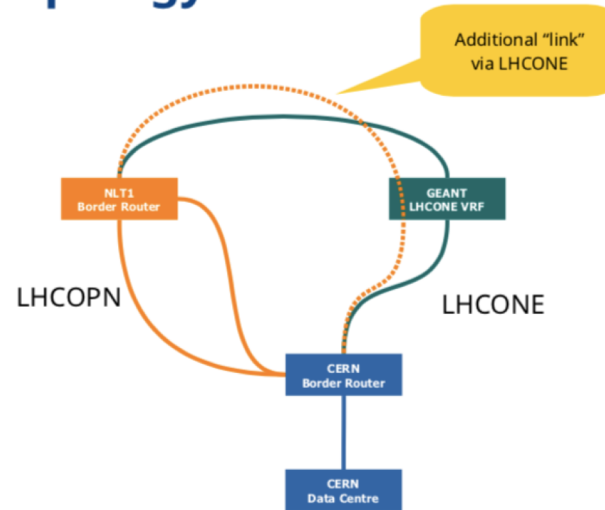
- *Test report* -

LHCONE meeting at Fermilab
31st November 2018
edoardo.martelli@cern.ch



We have successfully
deployed a manual test.

Network topology



CERN-NLT1 load balancing over
LHCOPN and LHCONE
- Test report -

LHCONE meeting at Fermilab
31st November 2018
edoardo.martelli@cern.ch



IT Information Technology Department

We have successfully
deployed a manual test.

CERN-NLT1 to LHCOPN and LHCONE
- Test report -

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Network topology



LHCOPN



Bandwidth gain for FTS

Details for `gsiftp://eosatlasftp.cern.ch` → `srm://srm.grid.sara.nl`

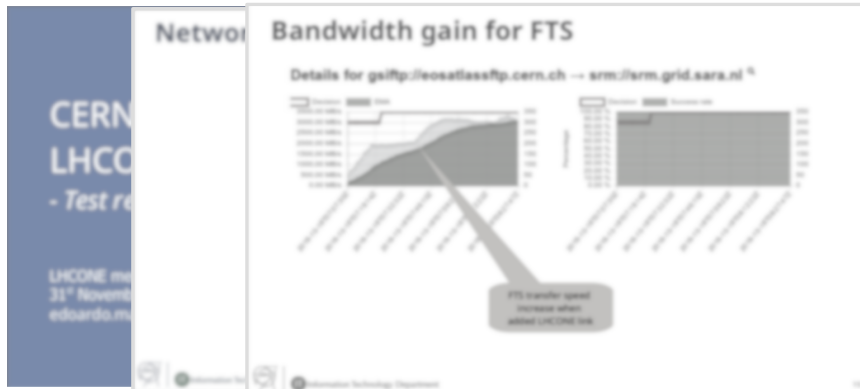


FTS transfer speed
increase when
added LHCONE link



We have successfully
deployed a manual test.

Conclusion:
load-balancing with
BGP metrics works.



For a wider deployment,
we are creating a prototype.

Data

#TB \forall links

\Rightarrow need ...

... FTS info

... IP prefixes

Interface

Human: Website

Machine: REST

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Human: Website

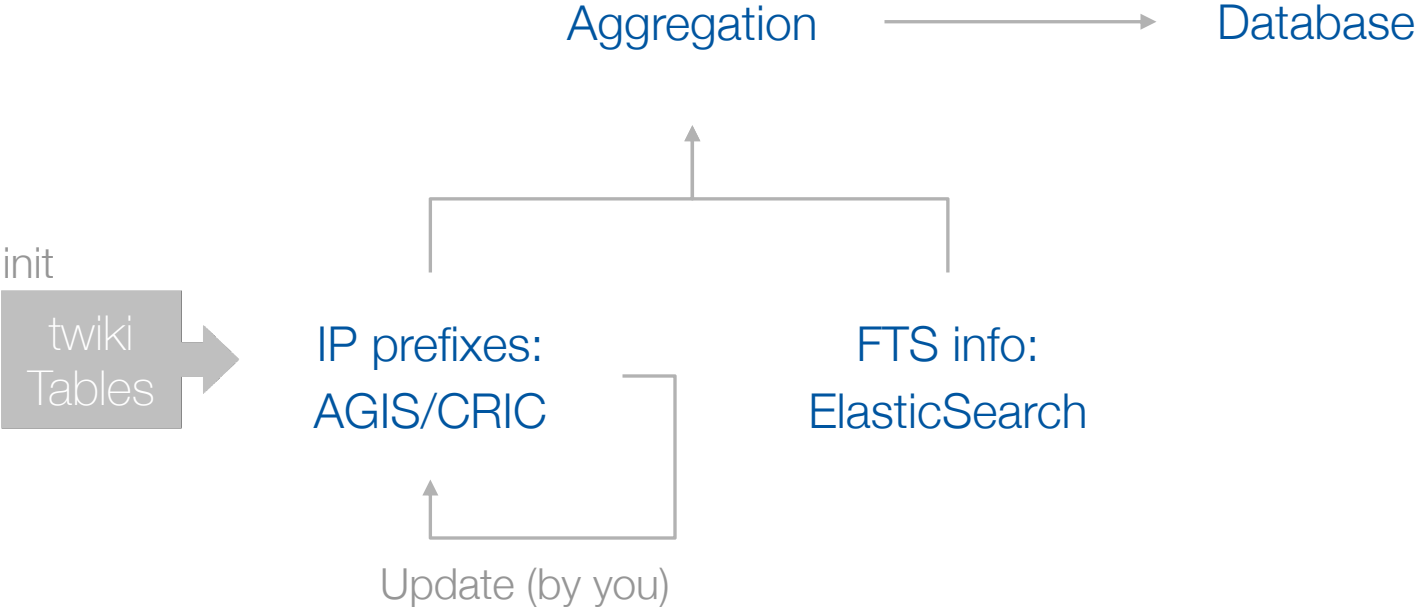
Machine: REST

Actions

Manual

SDN

We aggregate the data
from different sources.



For a wider deployment,
we are creating a prototype.

Data

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\Rightarrow need ...

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Interface

Human: Website

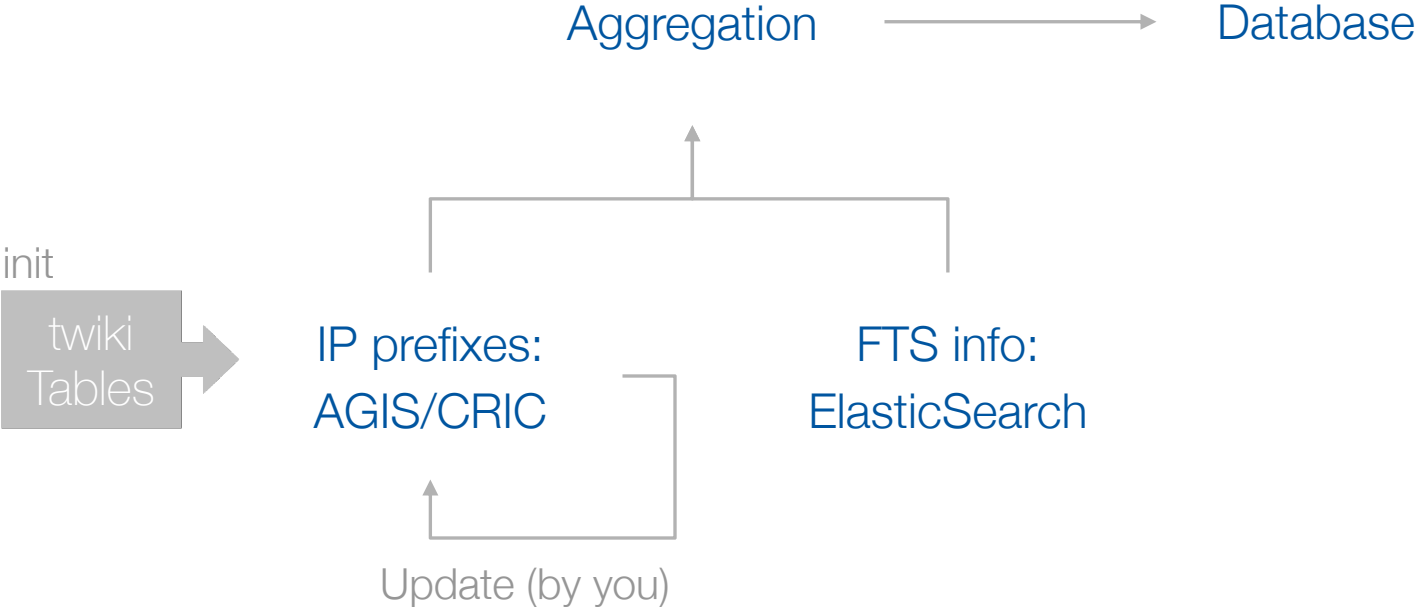
Machine: REST

Actions

Manual

SDN

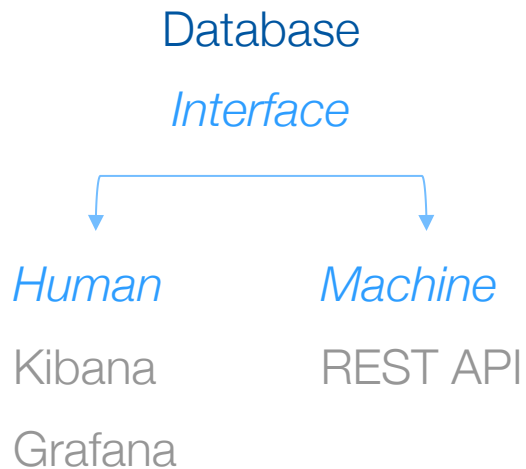
To access the data,
we need an interface.



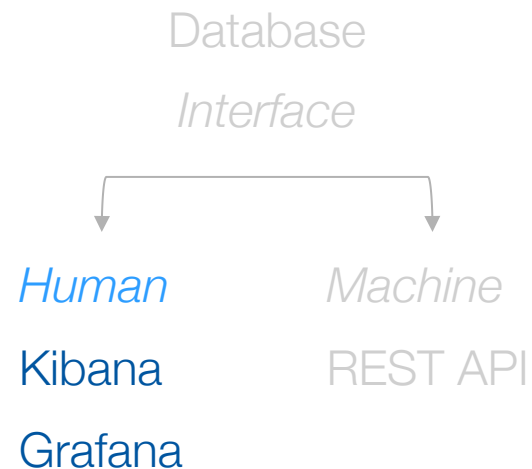
To access the data,
we need an interface.

Database

We provide an interface
for humans and machines.



We provide an interface
for humans and machines.



We plot results in the
short and long term.

Anticipated Transfer Size per Link

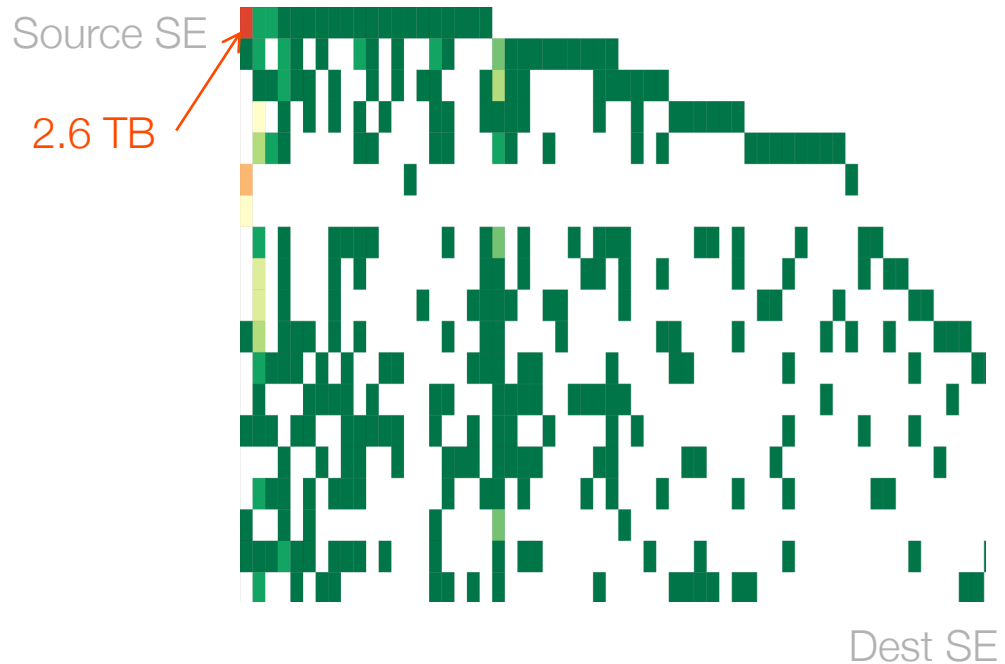
+ grouped by VO (e.g. CMS)

+ grouped by FTS Server

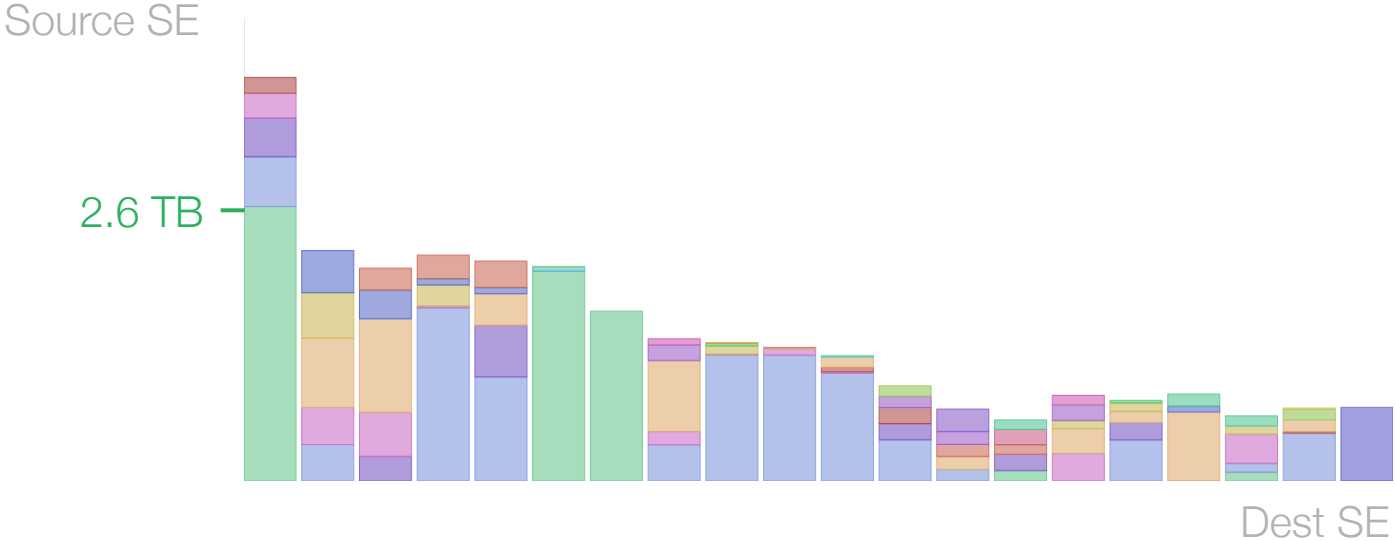
Evaluation of Optimization

Average Load per Link

We plot the short-term
expected file transfer size.

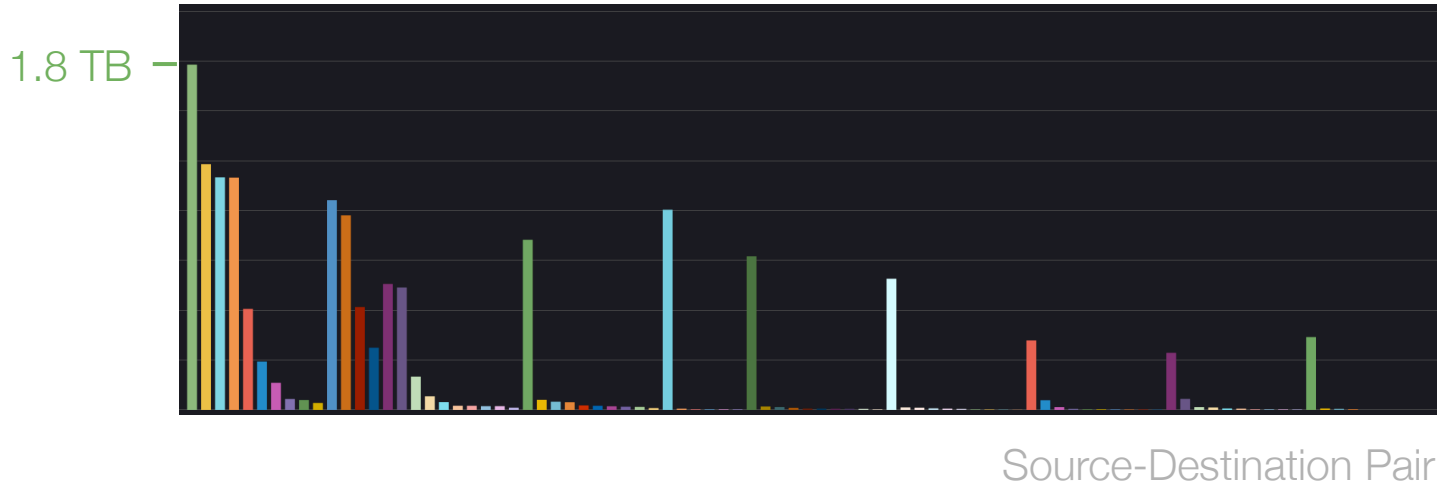


We plot the short-term expected file transfer size.



We plot the short-term
expected file transfer size.

File Transfer Size



We have successfully tested
manual network optimization.

Data

#TB \forall links

\Rightarrow need ...

... FTS info

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Interface

Human: Website

Machine: REST

Actions

Manual

SDN

To create the prototype,
we need *your* input.

Data

#TB \forall links

\Rightarrow need ...

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Interface

Human: Website

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Manual

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To create the prototype,
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Actions

Manual

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Questions?

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