A Multipath Controller for Accelerating GridFTP Transfer over SDN

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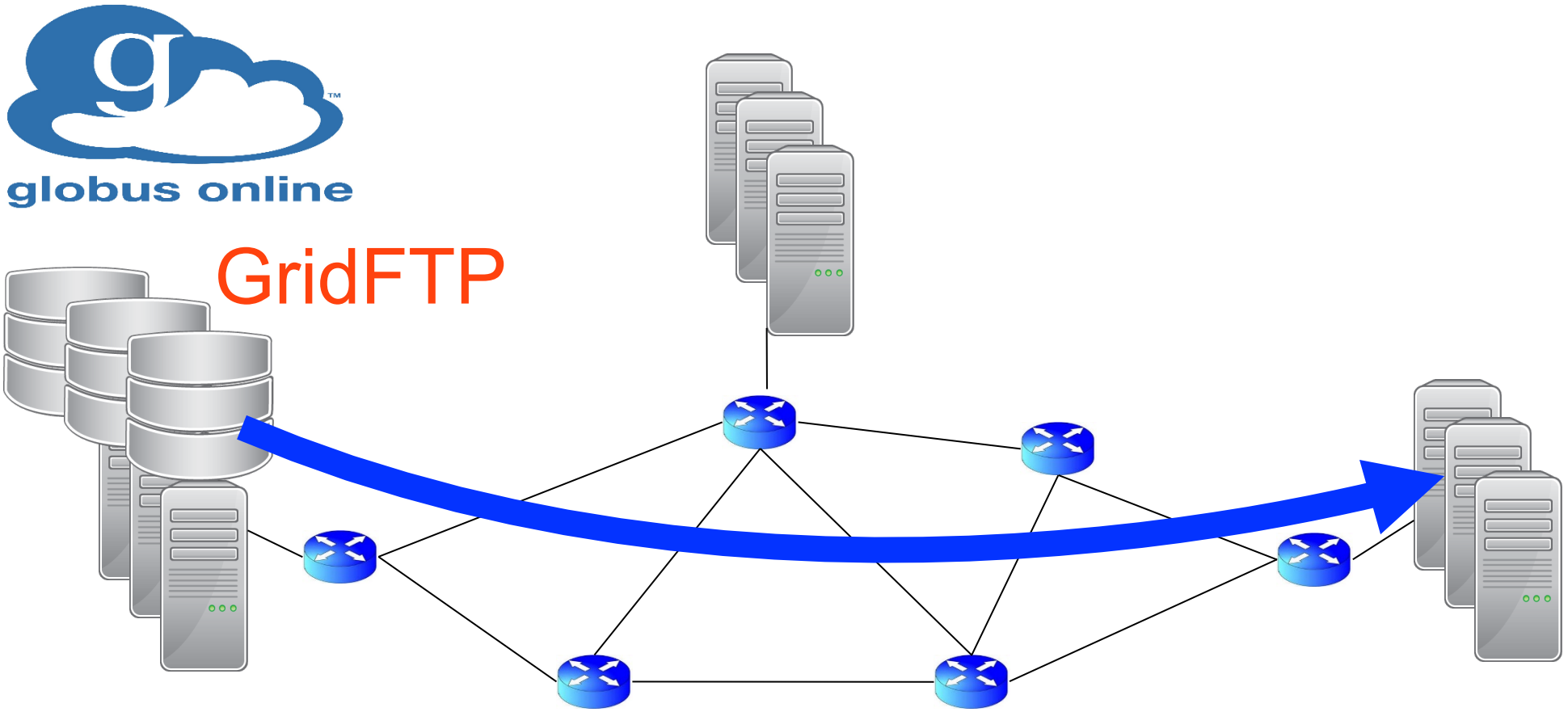
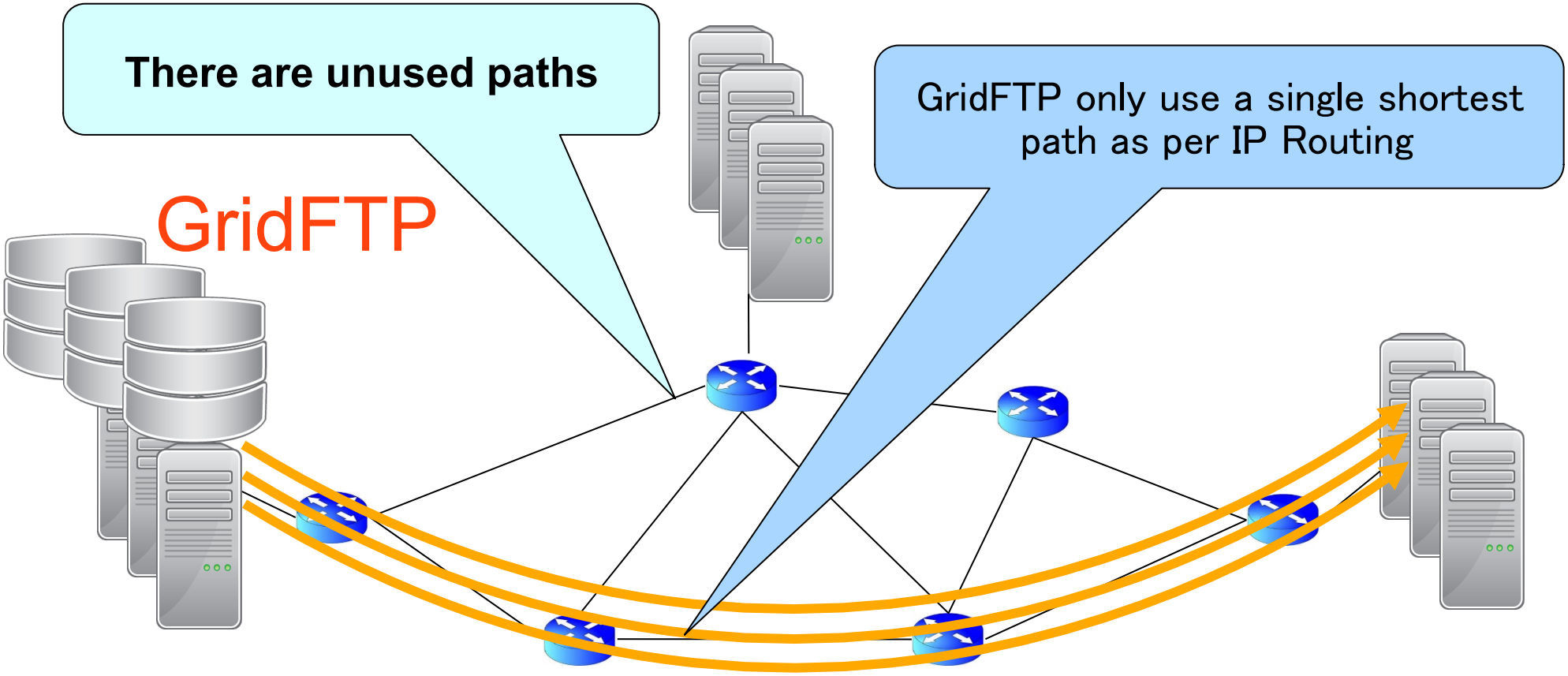
Background

- The large scaleness of data utilisation in scientific research
  - A platform service for the high-speed large-scale data transfer between sites is necessary



Problem

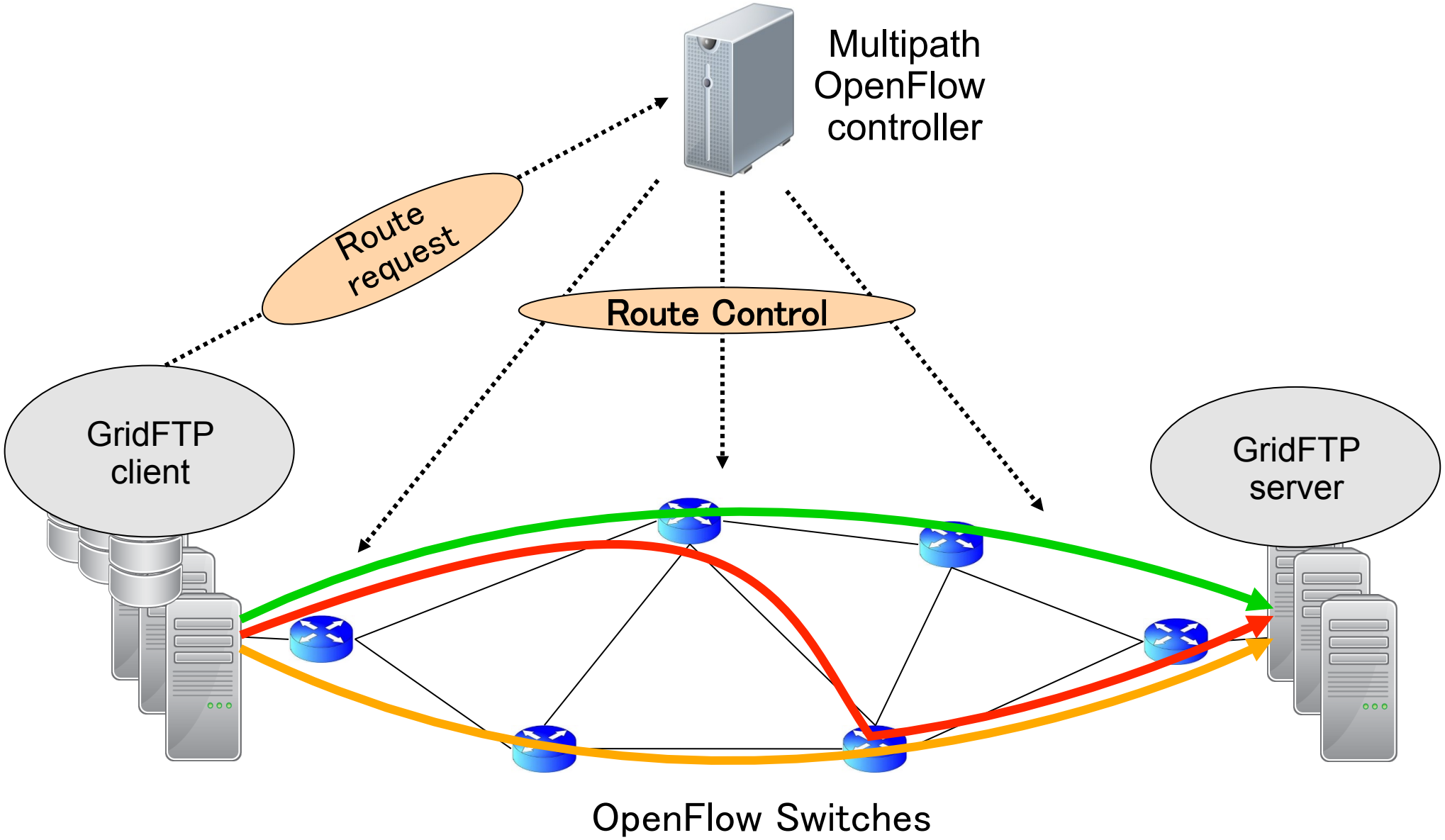
- GridFTP's high-speed transfer
  - GridFTP supports parallel data transfer scheme by using multiple TCP streams to realize high speed transfer



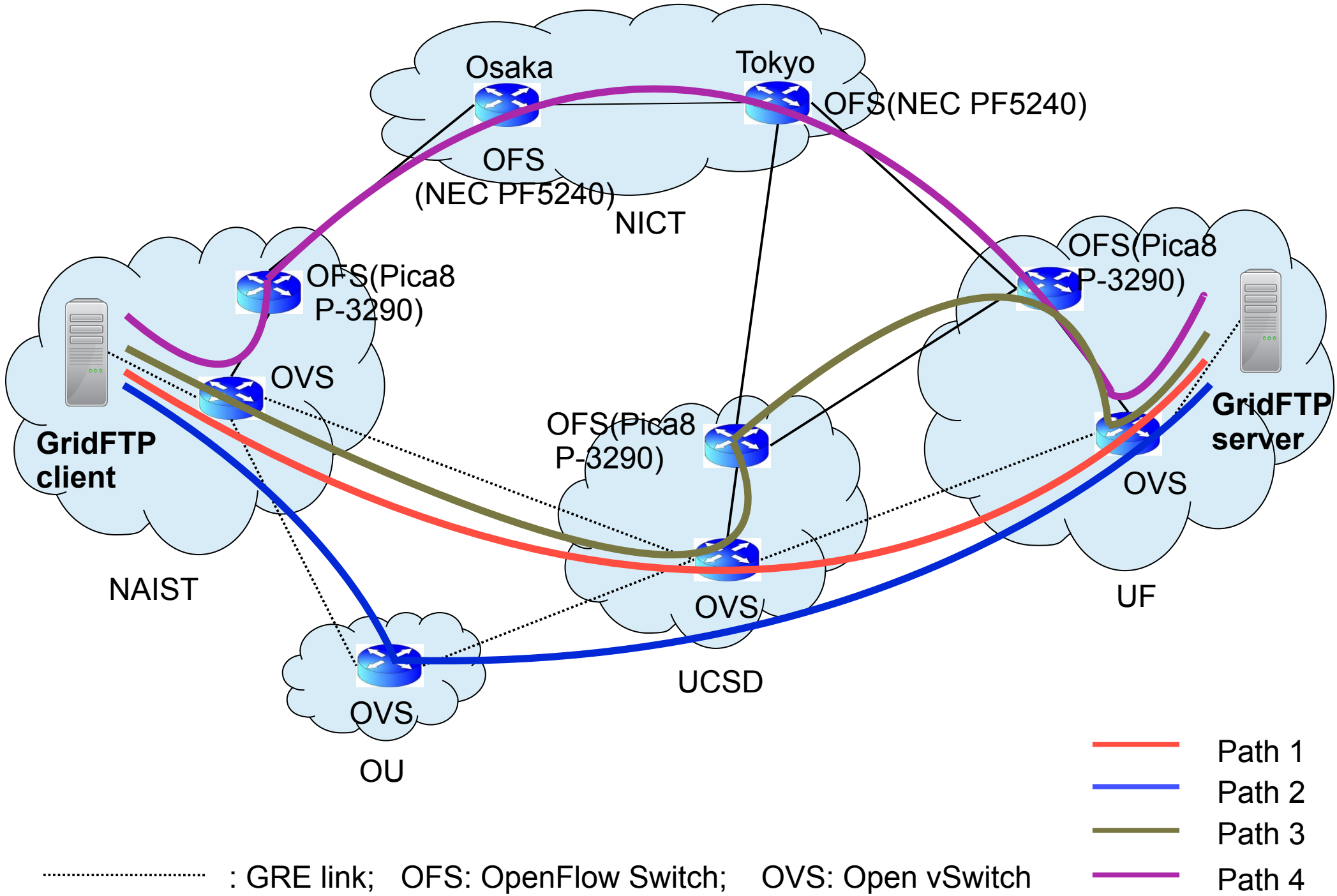
Traffic engineering would allow GridFTP to use multiple paths improving its performance.

Approach

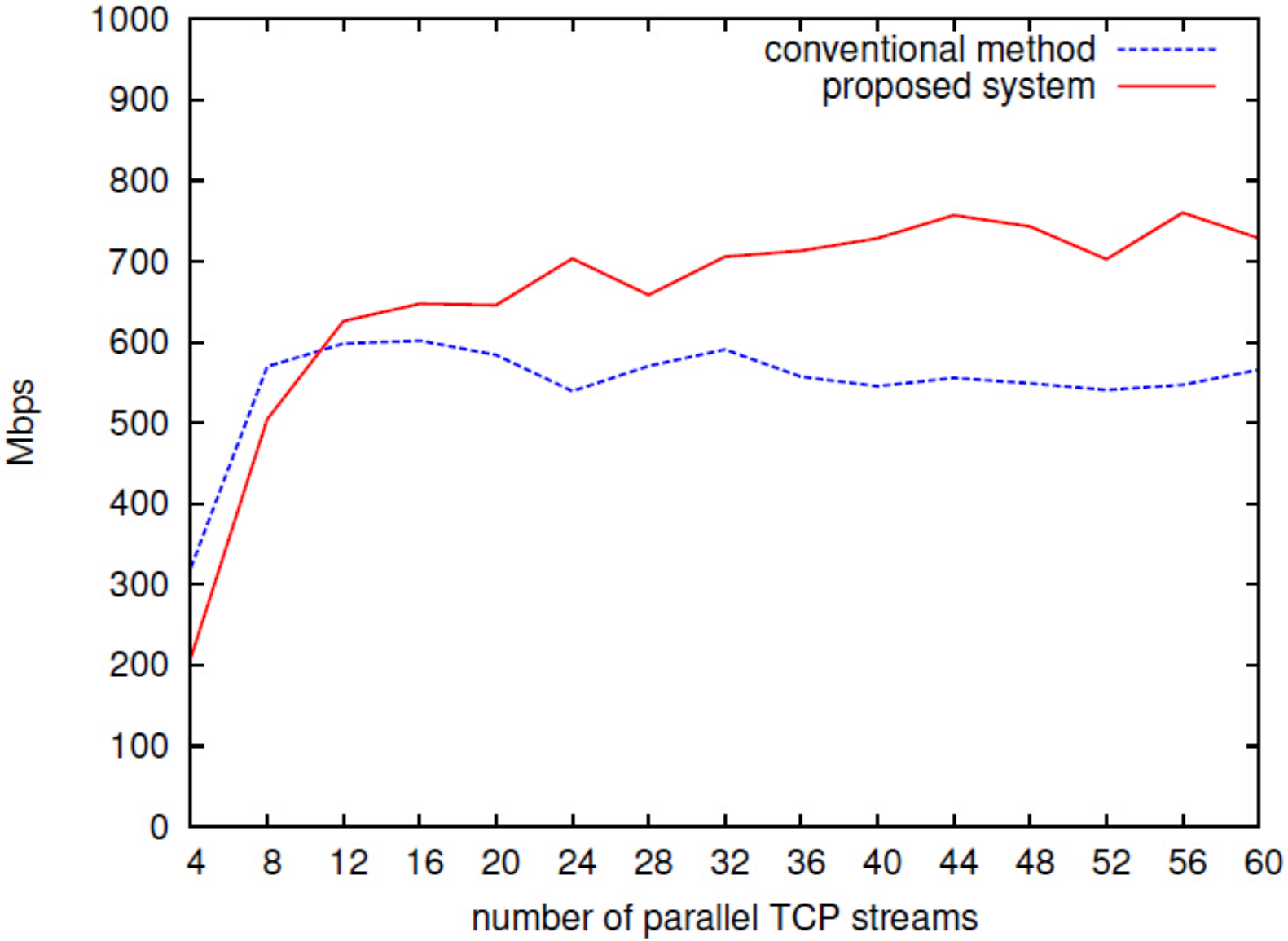
- Parallel GridFTP transfer using SDN



Test on PRAGMA-ENT

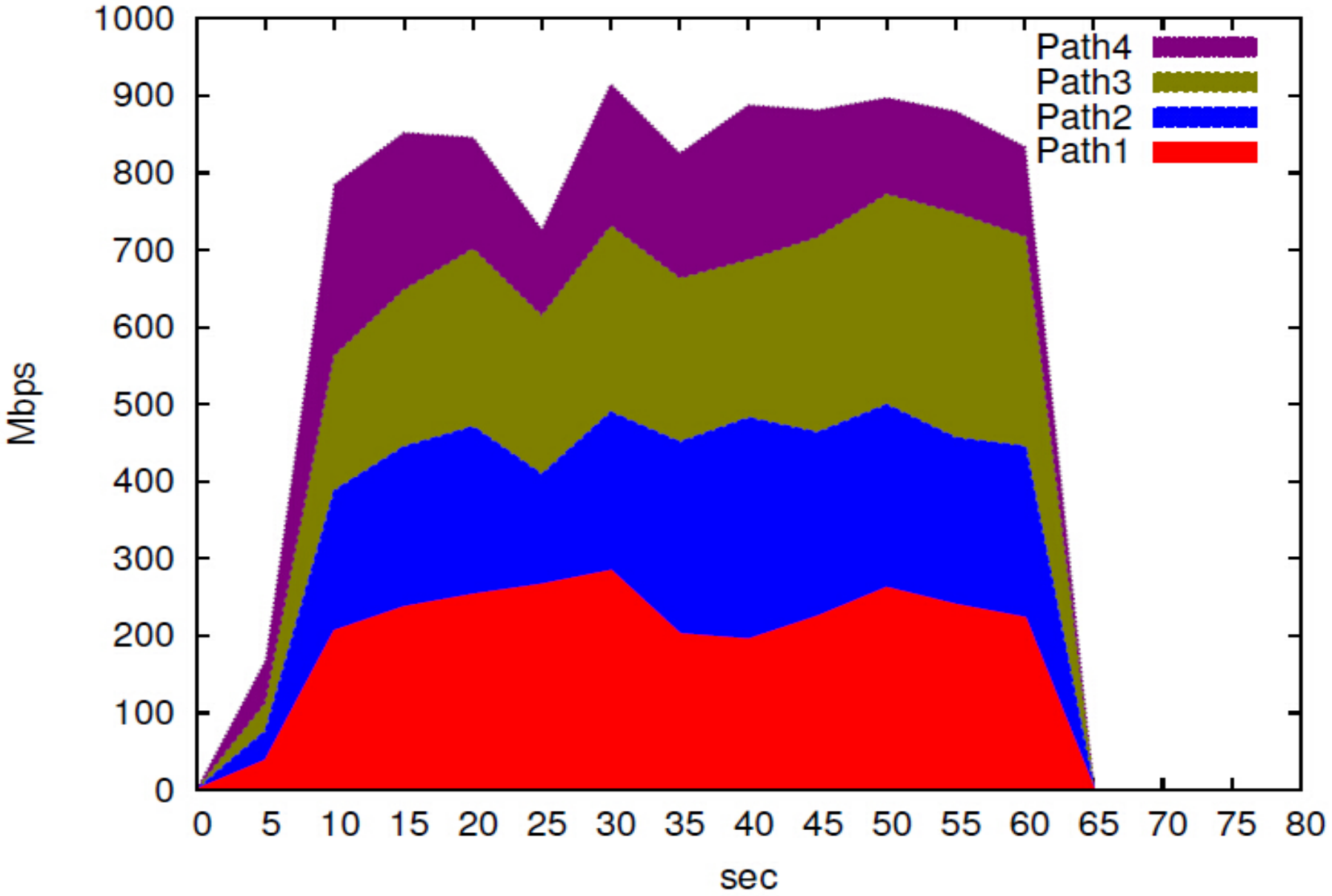


Average Speed of Data Transfer



Result1: Average speed of data transfer between proposed system and conventional method for increasing the number of parallel TCP streams one by four

Used Bandwidth of Each Path

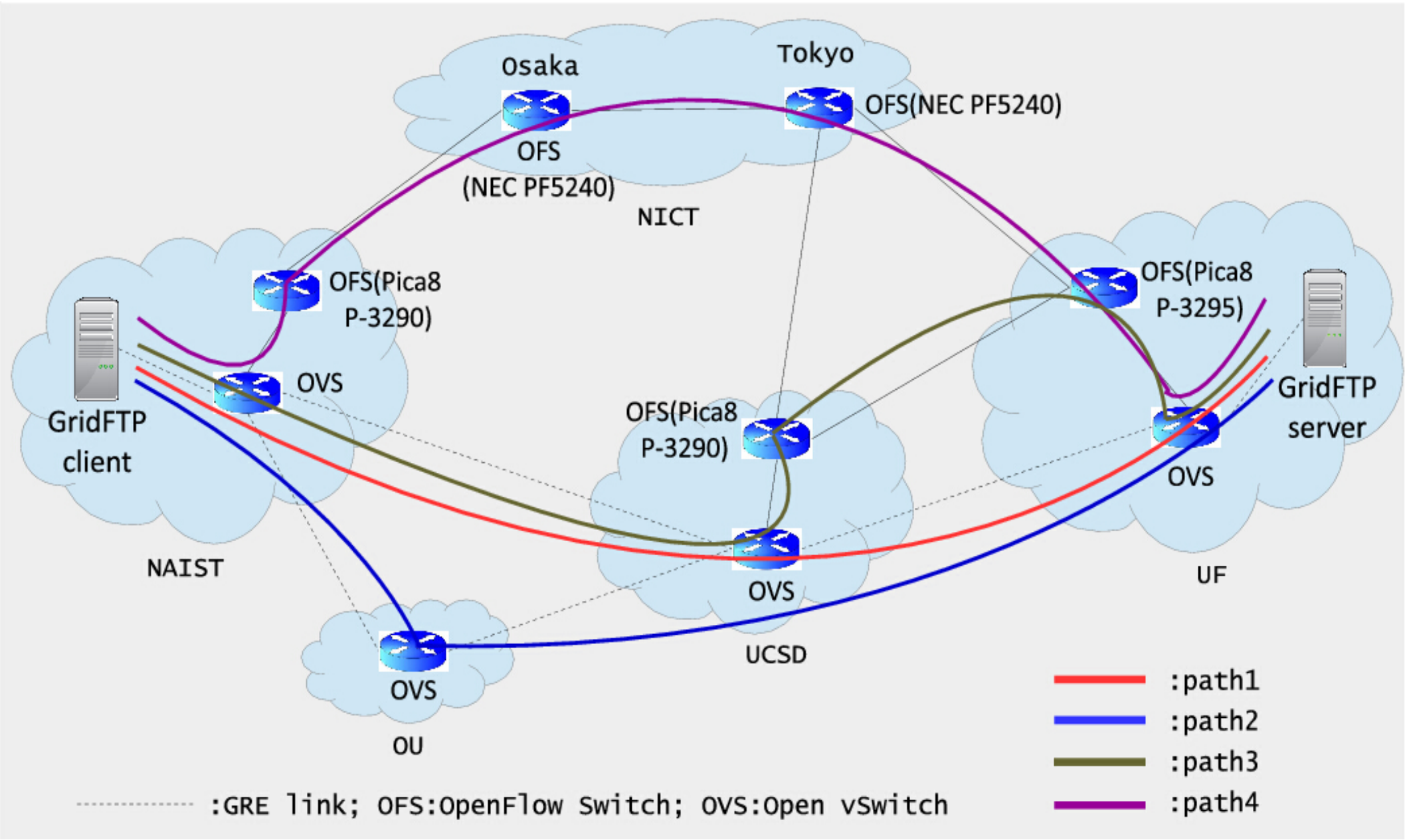


Result2: Used bandwidth of each path by using 24 parallel TCP streams of proposed system(Each path used 6 parallel TCP streams)

Future Work

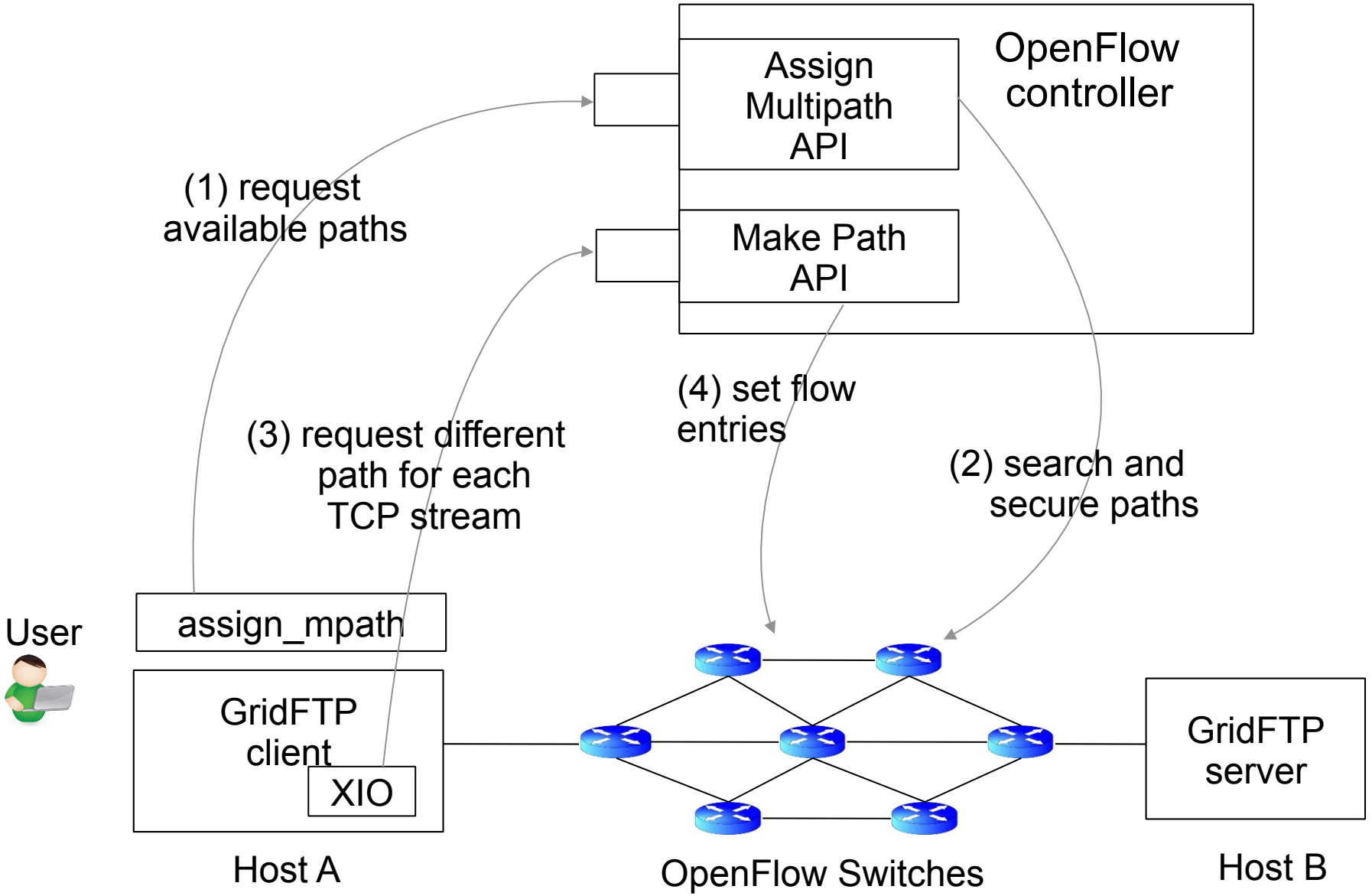
- Implement algorithms to search optimal routes considering bandwidth and latency of each path
- Consider a method that calculates the optimal number of parallel TCP streams for each path

Test on PRAGMA-ENT

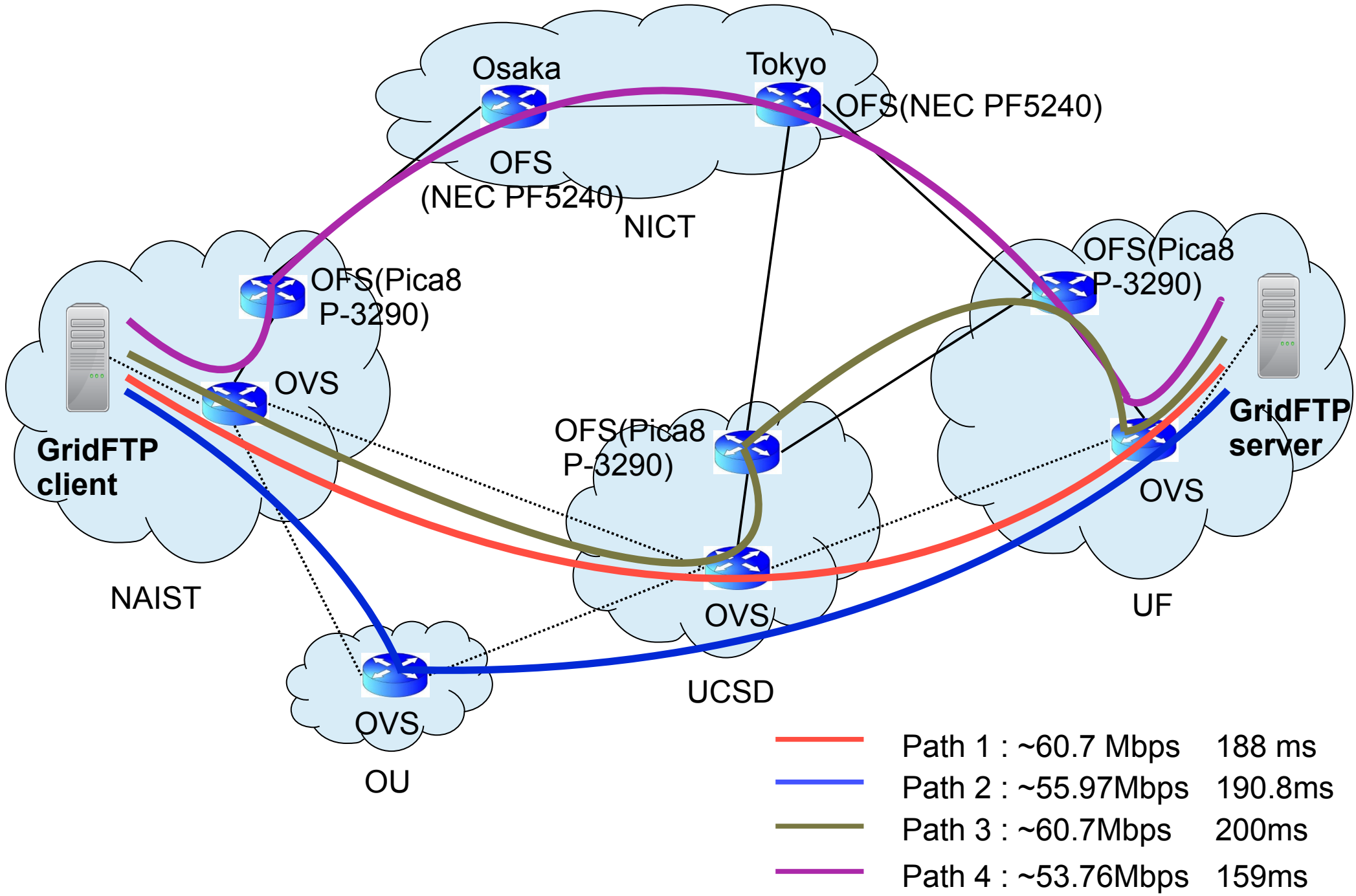


Approach

- Parallel GridFTP transfer using SDN



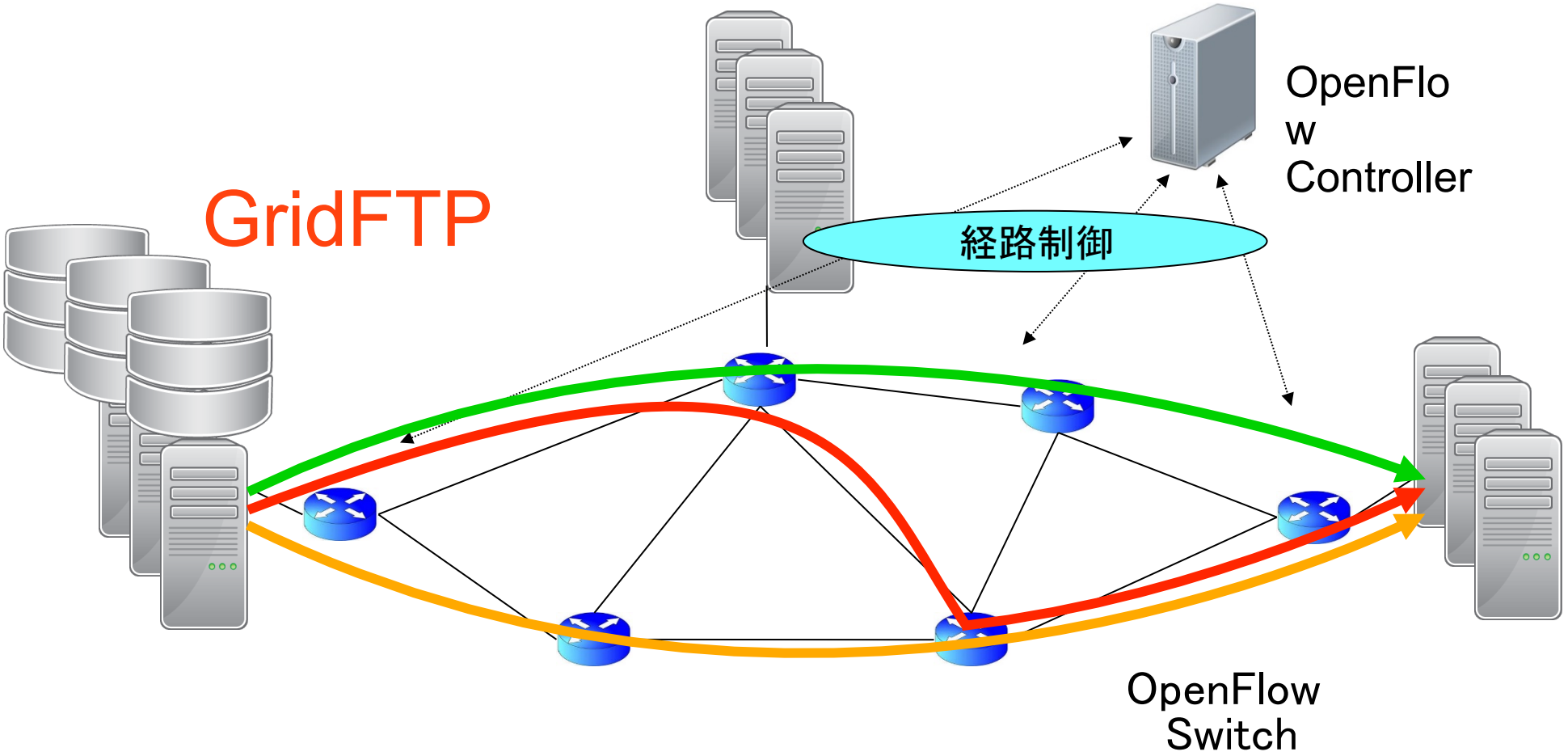
Future Work


Osaka
Tokyo
OFS(NEC PF5240)
OFS
(NEC PF5240)
NICT
OFS(Pica8
P-3290)
OVS
GridFTP
client
NAIST
OFS(Pica8
P-3290)
OVS
UCSD
OFS(Pica8
P-3290)
OVS
UF
GridFTP
server
OVS
OU
Path 1 : ~60.7 Mbps 188 ms
Path 2 : ~55.97Mbps 190.8ms
Path 3 : ~60.7Mbps 200ms
Path 4 : ~53.76Mbps 159ms

研究目的

SDN技術を用いたトラフィックエンジニアリング

GridFTPが用いる複数TCPストリームによる
並列転送を複数のネットワーク経路に分散



データ転送高速化システムを実現