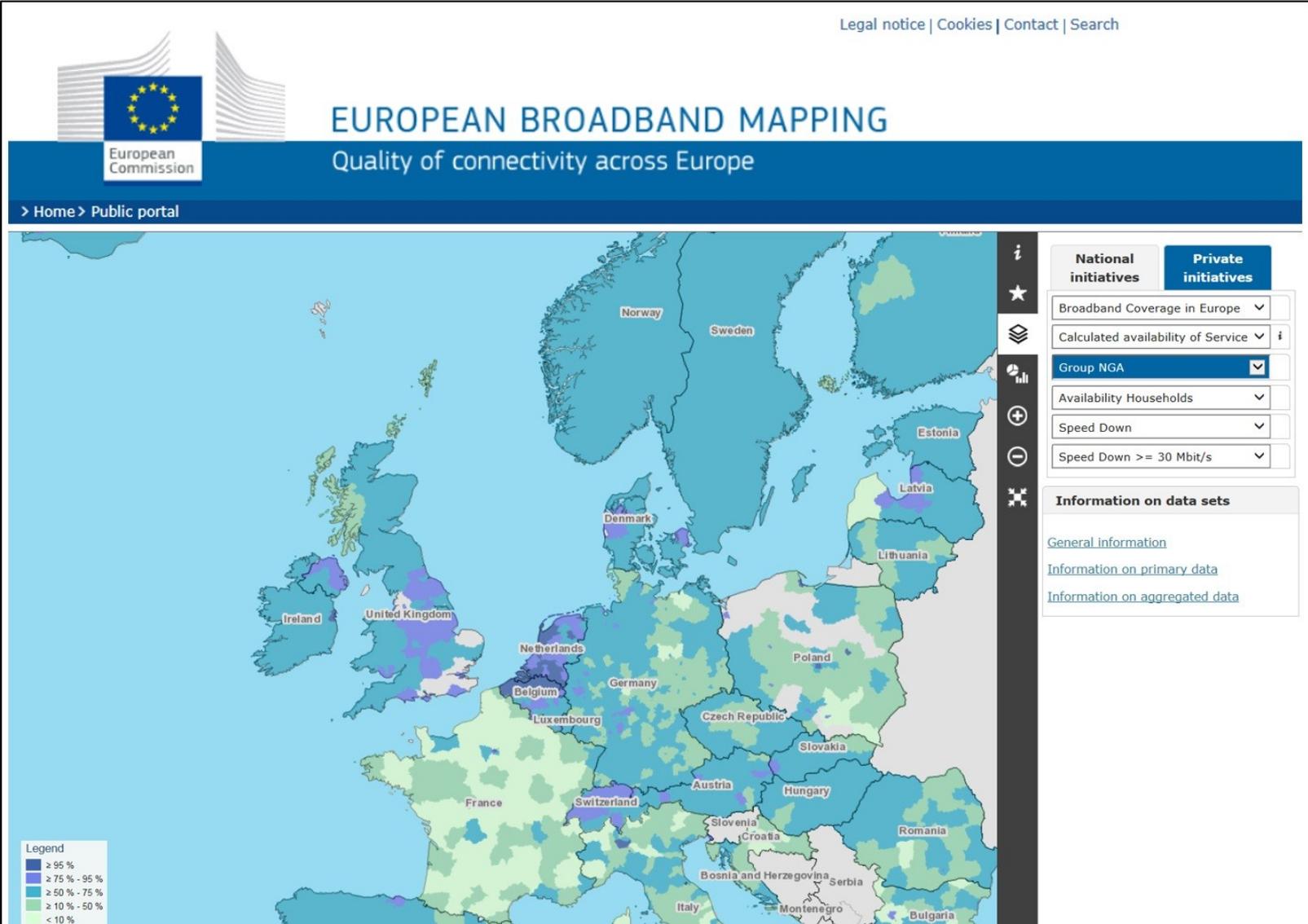


Deploying Hybrid Access Networks with MPTCP

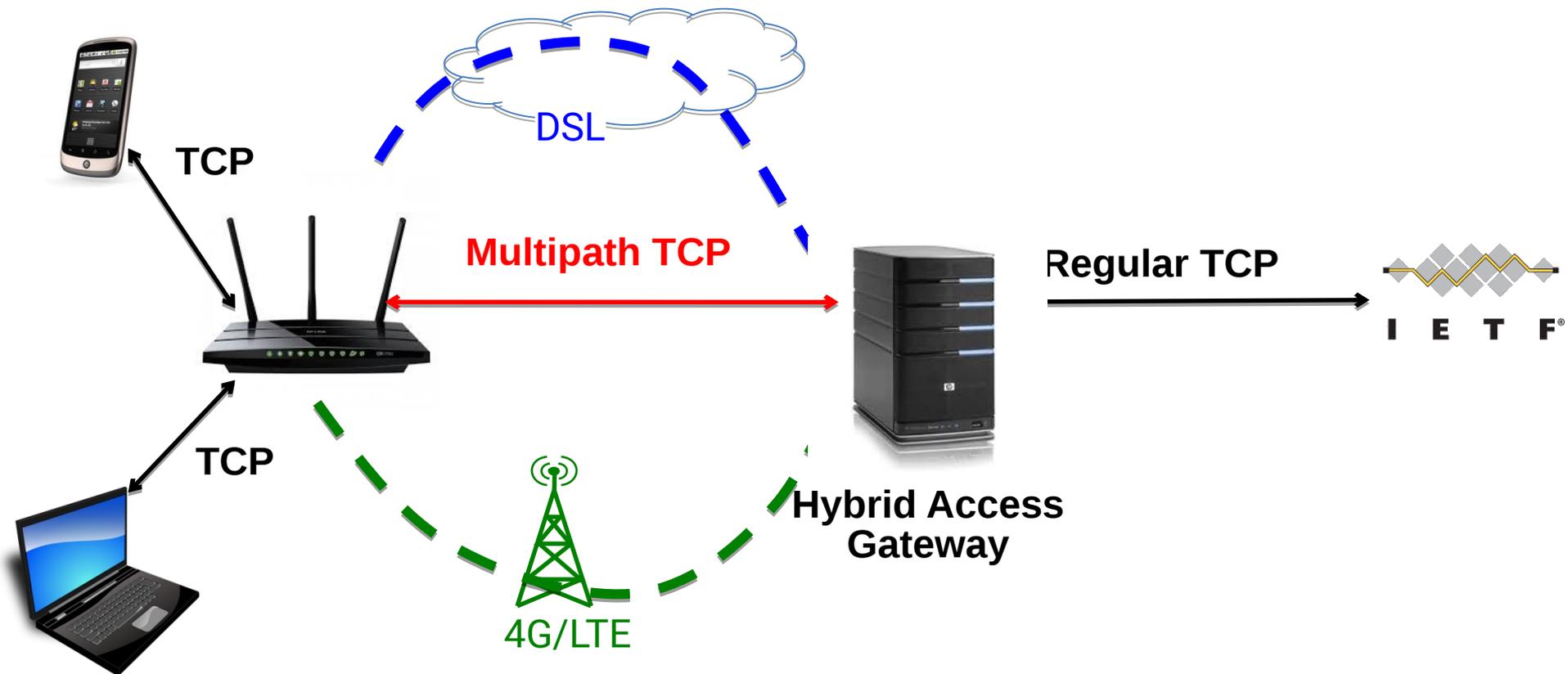
IETF104, March 2019

O. Bonaventure (Tessares)

Motivation



Using Multipath TCP to build Hybrid Access Networks

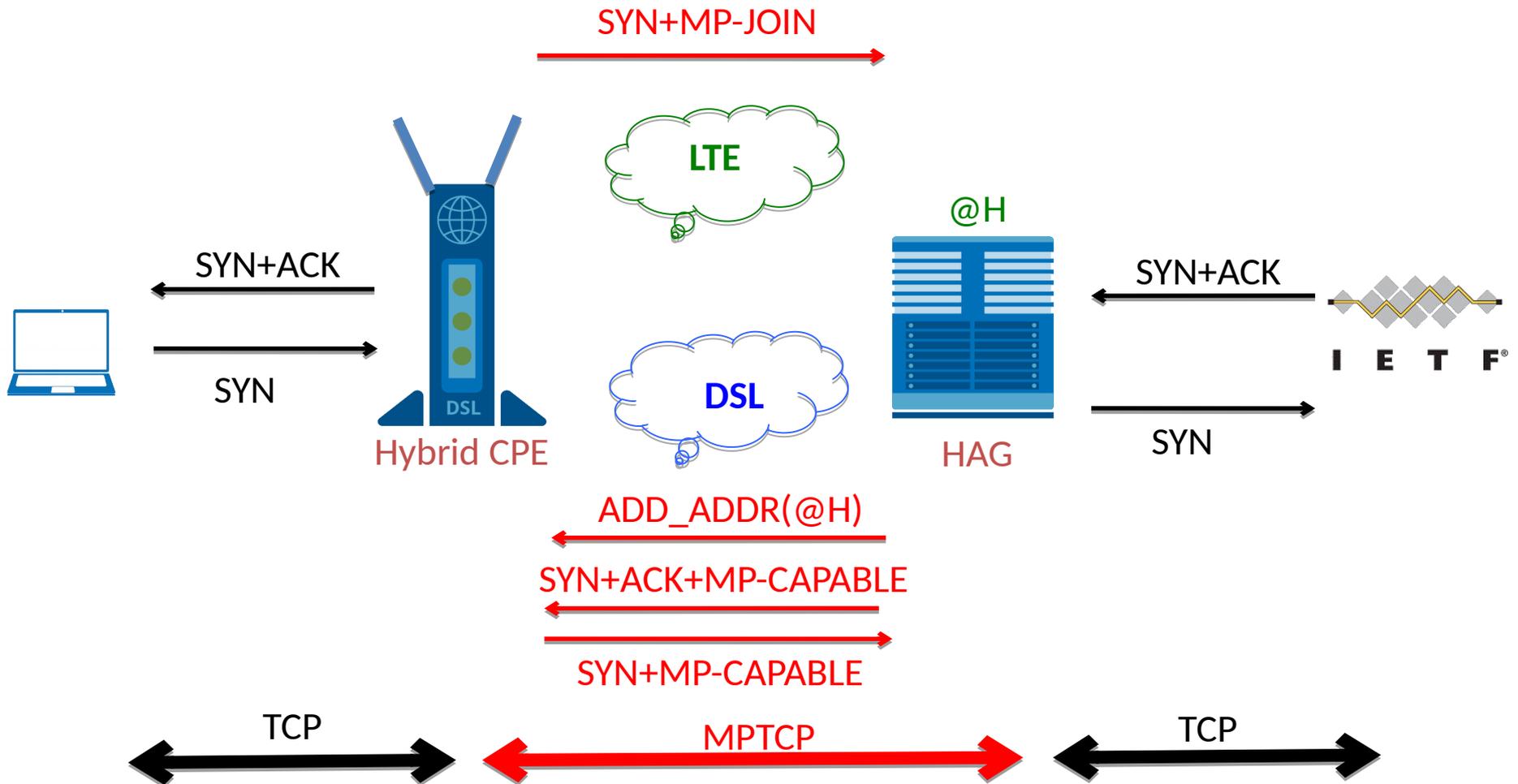


See BBF's WT-378 and draft-ietf-tcpm-converters discussed within the tcpm working group

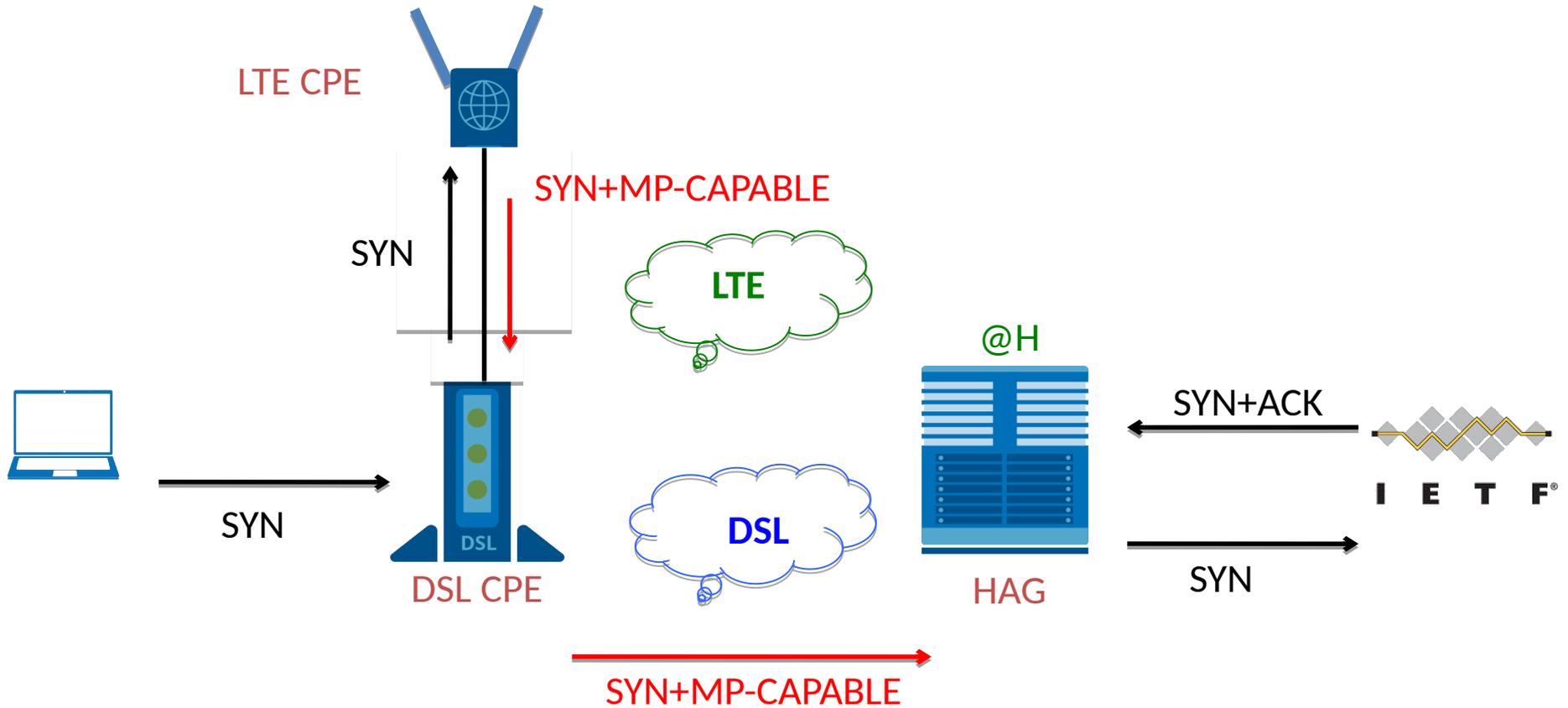
Deploying Hybrid CPEs

- Includes a transparent TCP<->MPTCP proxy
- Three main types of deployments
 - Proxy added to an existing xDSL CPE that is attached to an LTE CPE
 - Allows to reuse existing CPEs, but performance issues
 - Proxy in hybrid CPE that combines xDSL and LTE
 - Requires replacing existing CPEs
 - xDSL CPE modified to redirect IP packets to LTE CPE that includes Proxy
 - Reuses existing CPEs and leverages performance of LTE CPE

Running the proxy on an hybrid CPE

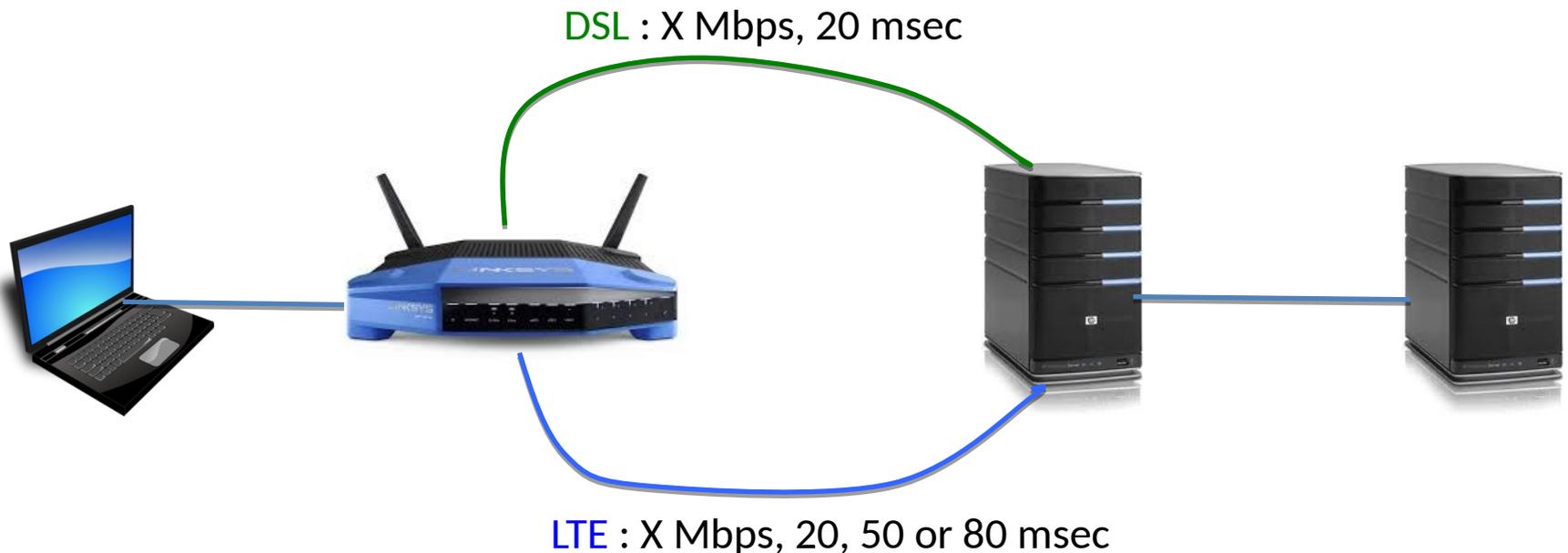


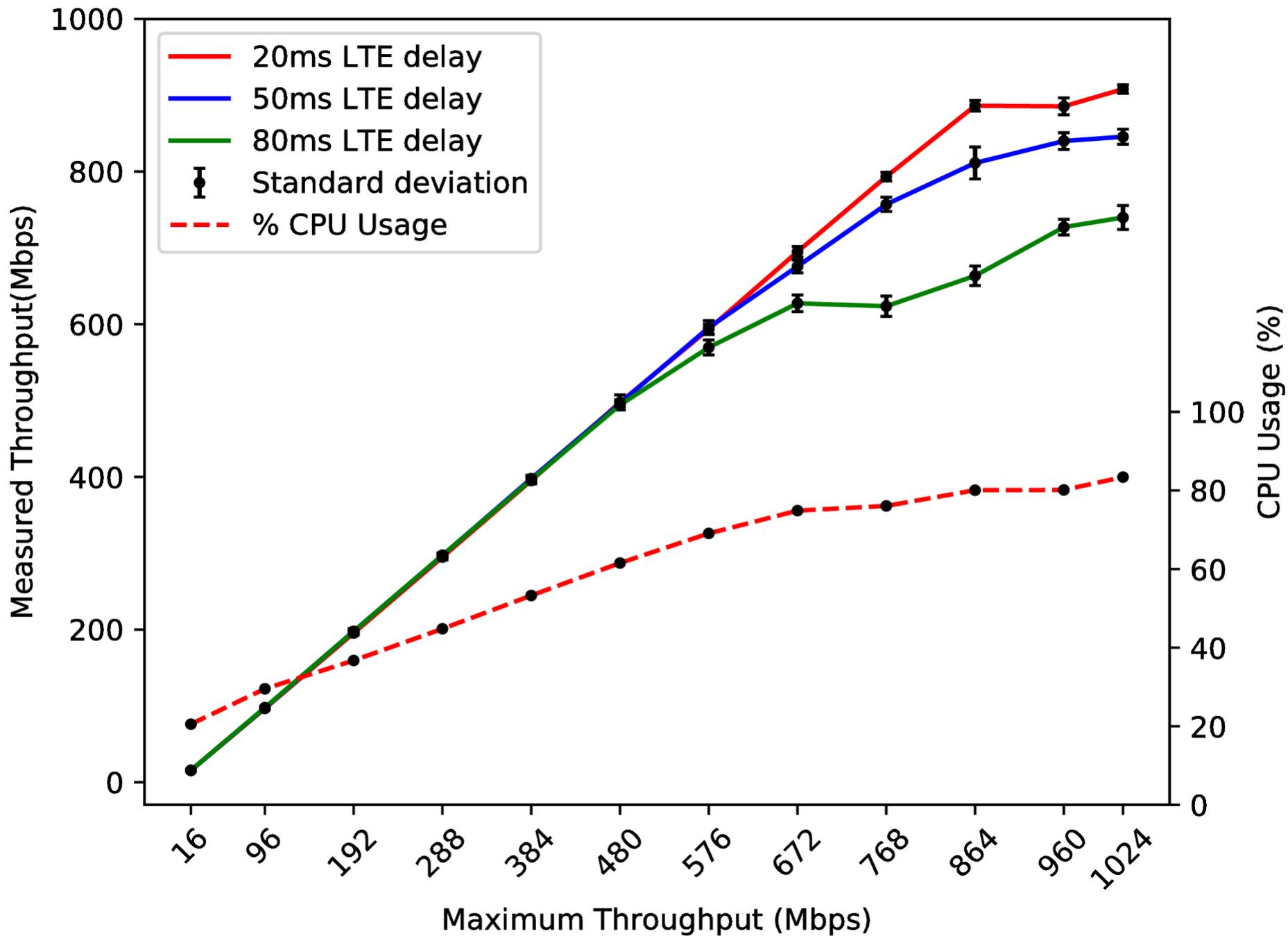
Running the proxy on an LTE CPE



Performance of Hybrid CPEs

- Mainly depends on their CPU
 - Example with Linksys WRT1200 AC using an Armada 385 @1.33 Ghz

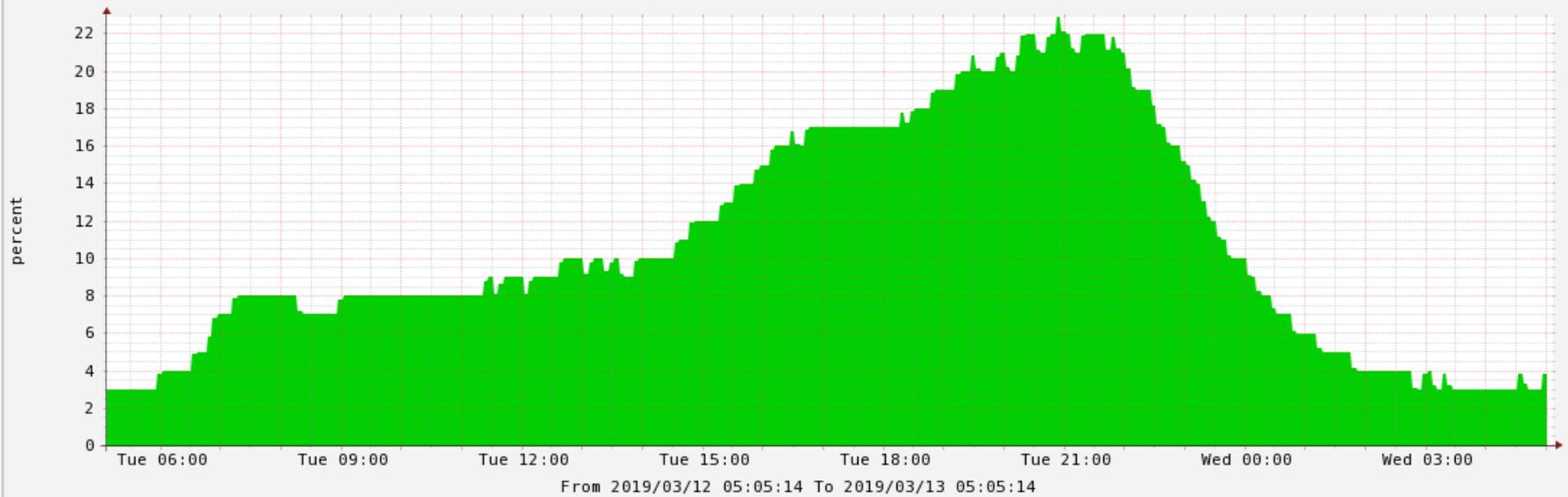




The Hybrid Access Gateway

- Deployment models depend on how the xDSL and LTE networks are organised
 - Centralised HAG if they only converge in backbone
 - Distributed HAGs located where both networks interconnect
 - HAG can run on physical servers or inside virtual machines

CPU

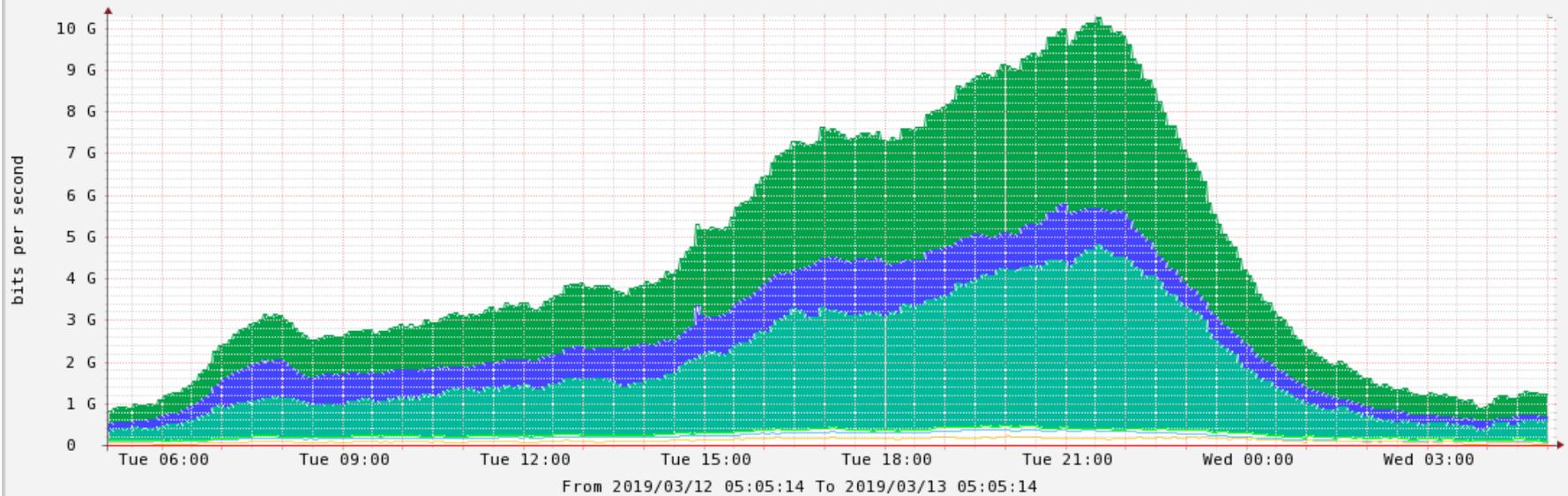


Current: 3.87%

Average: 10.74%

Maximum: 22.87%

Traffic - All



Traffic Type	Current	Average	Maximum
cpe Inbound	84.53 M	211.45 M	375.55 M
cpe Outbound	697.22 M	2.64 G	5.79 G
internet Inbound	1.24 G	4.49 G	10.26 G
internet Outbound	111.13 M	273.07 M	482.85 M
lte Inbound	44.13 M	120.31 M	232.71 M
lte Outbound	570.93 M	1.95 G	4.82 G

Conclusion

- Multipath TCP enables Hybrid Access Networks that boost Internet access
- Several deployment models for CPEs
 - Hybrid CPE and two boxes solutions
- Several deployment models for HAGs
 - Centralised HAG and Distributed HAG
- 3GPP has recently selected Multipath TCP with the 0-rtt convert protocol for Access Traffic Steering Switch and Splitting (ATSSS) in 5G
 - See discussion on draft-ietf-tcpm-converters in tcpm