TCM-TF Problem Statement

TCMTF BoF

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Services to be optimized

Emerging real-time services have increased their popularity (e.g., online games, VoIP, etc.)

- Many of them **do not use RTP** (bare UDP, or TCP)
- They generate **tiny packets** (20-40 bytes payload)
- Users are very **sensitive to delay**

Services to be optimized

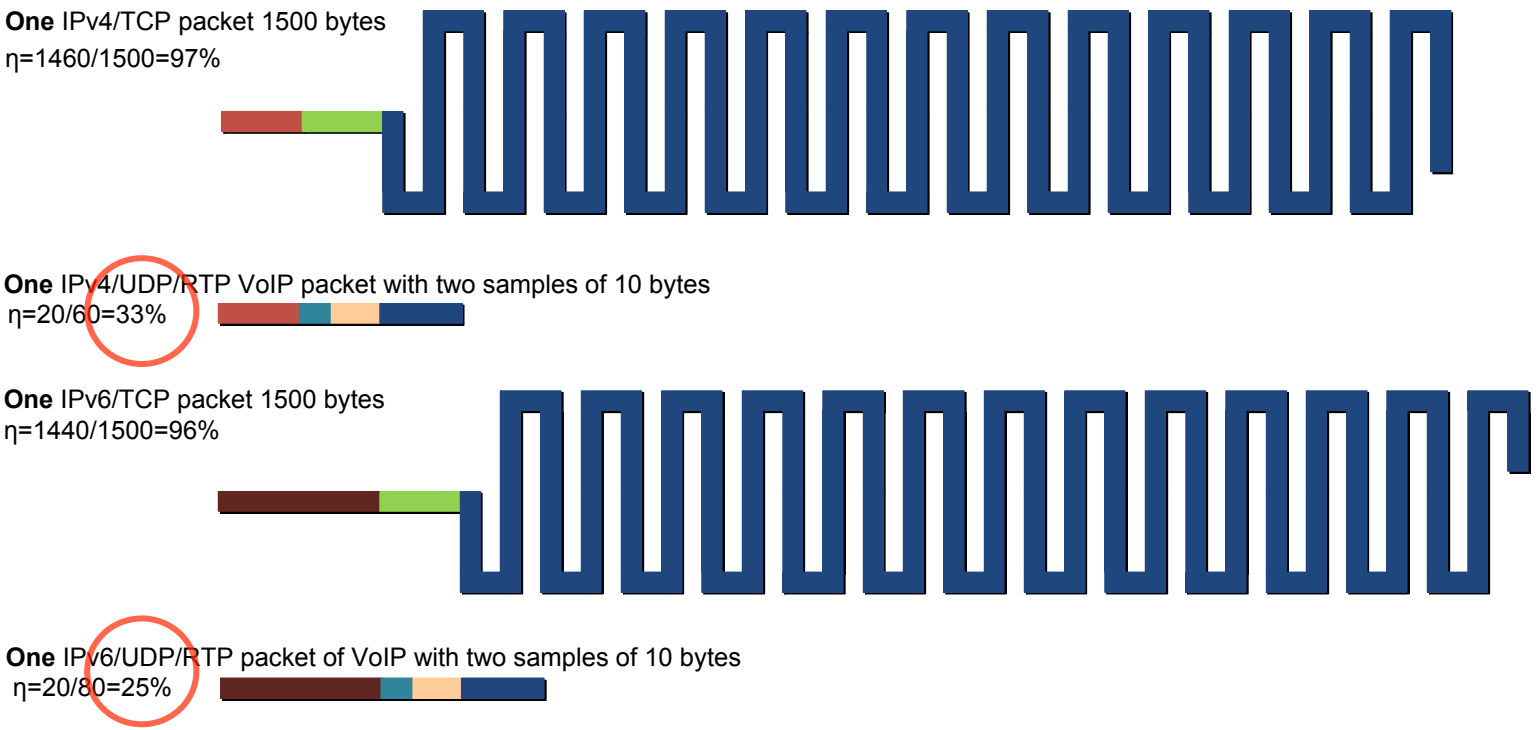
Non delay-sensitive services using small packets

- **Instant messaging**
- **M2M**
- **Sensor networks**

Services to be optimized

Small packets = inefficient payload-to-header ratio

- IP**v4**/UDP/RTP headers: 40 bytes
- IP**v6**/UDP/RTP headers: 60 bytes

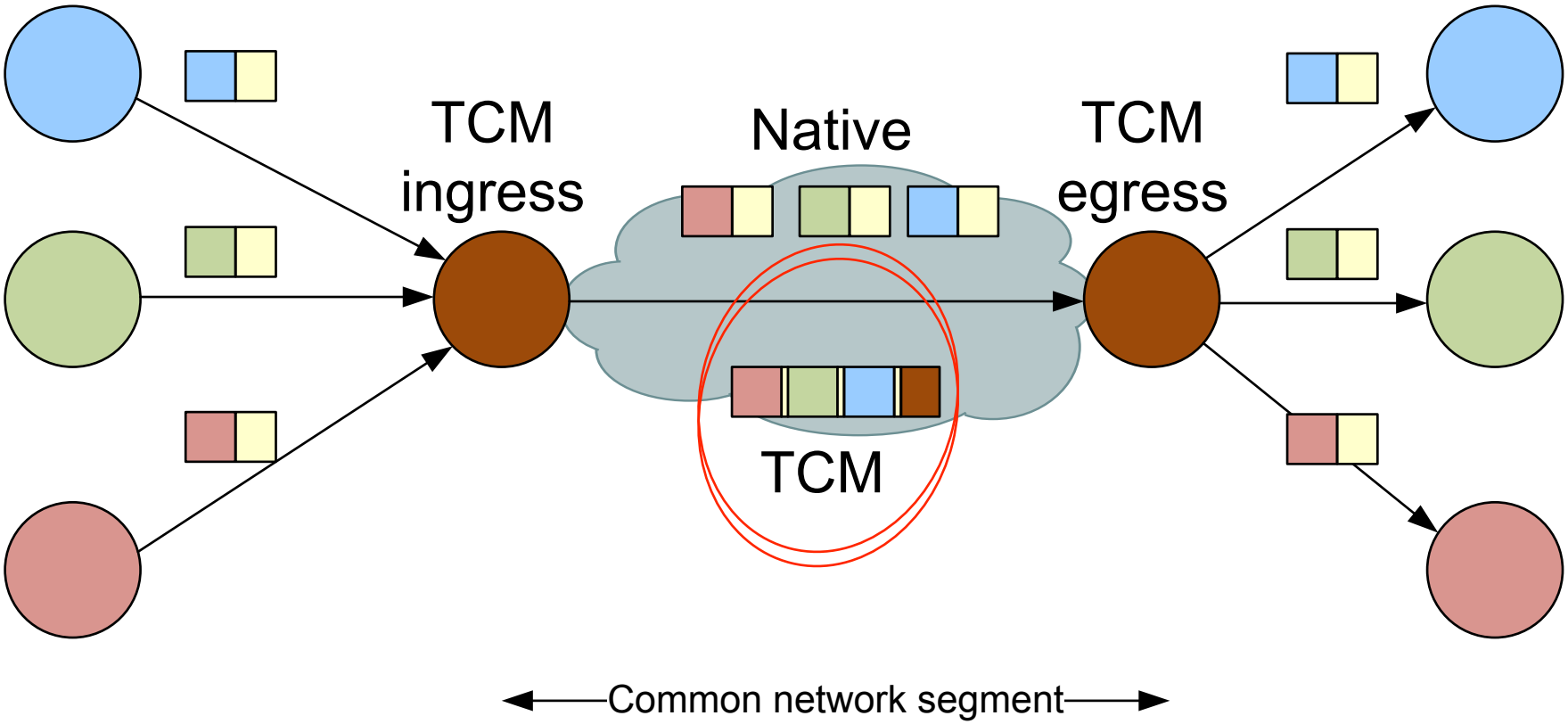


TCM-TF Proposal

Compress and multiplex small-packet flows to

- save bandwdith
- reduce packets per second

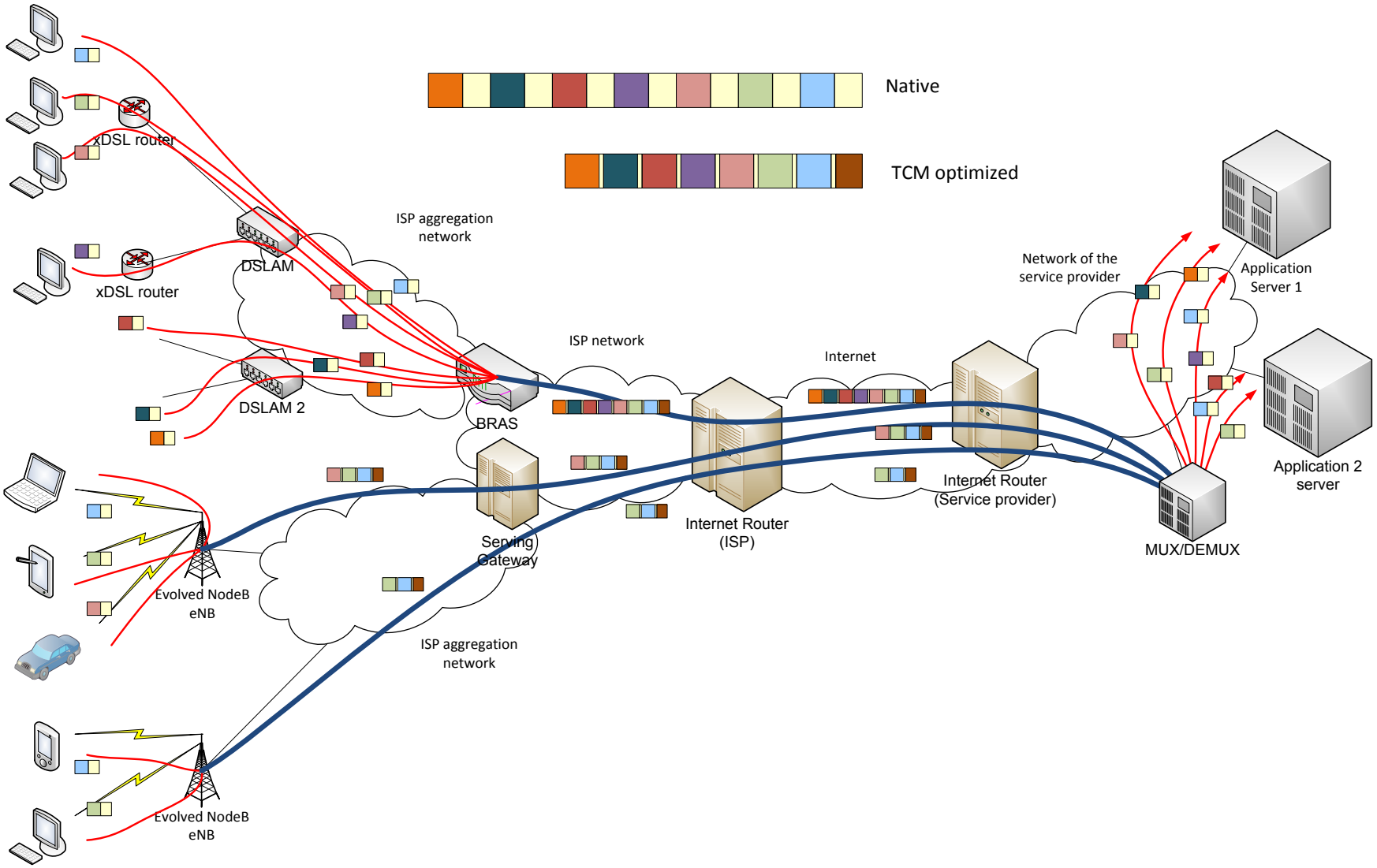
TCM-TF: Basic Idea



Scenarios

TCM-TF scenarios

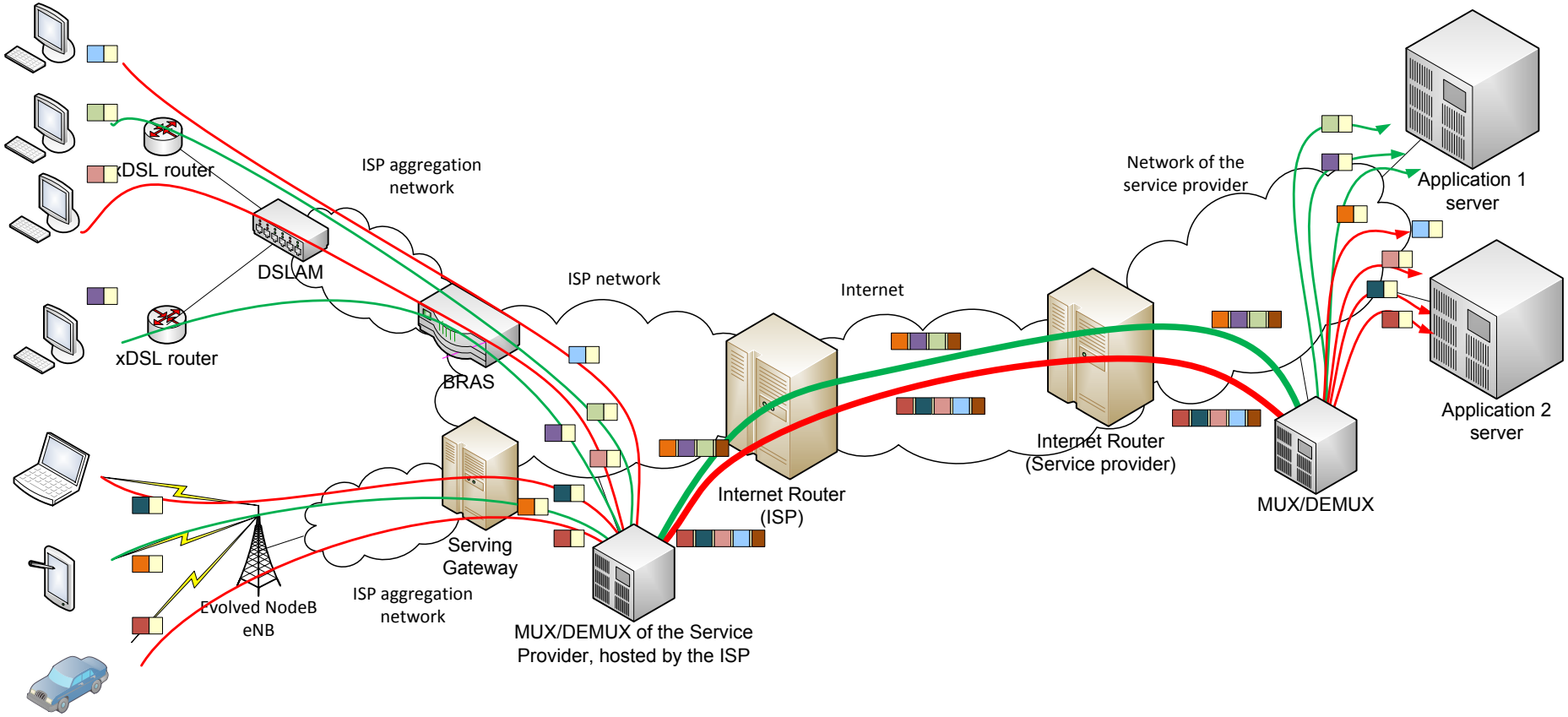
Residential scenario



TCM-TF scenarios

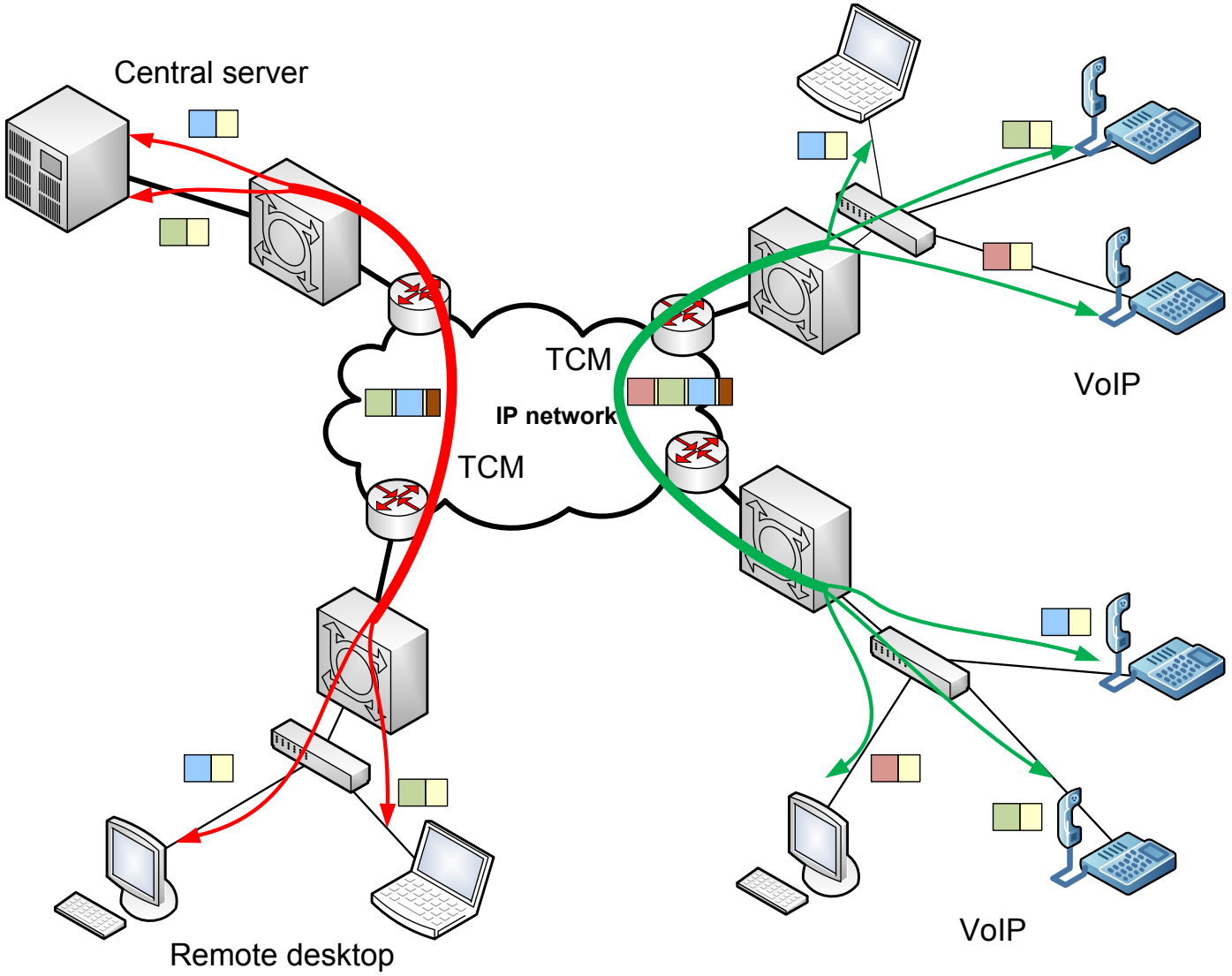
Residential scenario:

agreement network operator-service provider



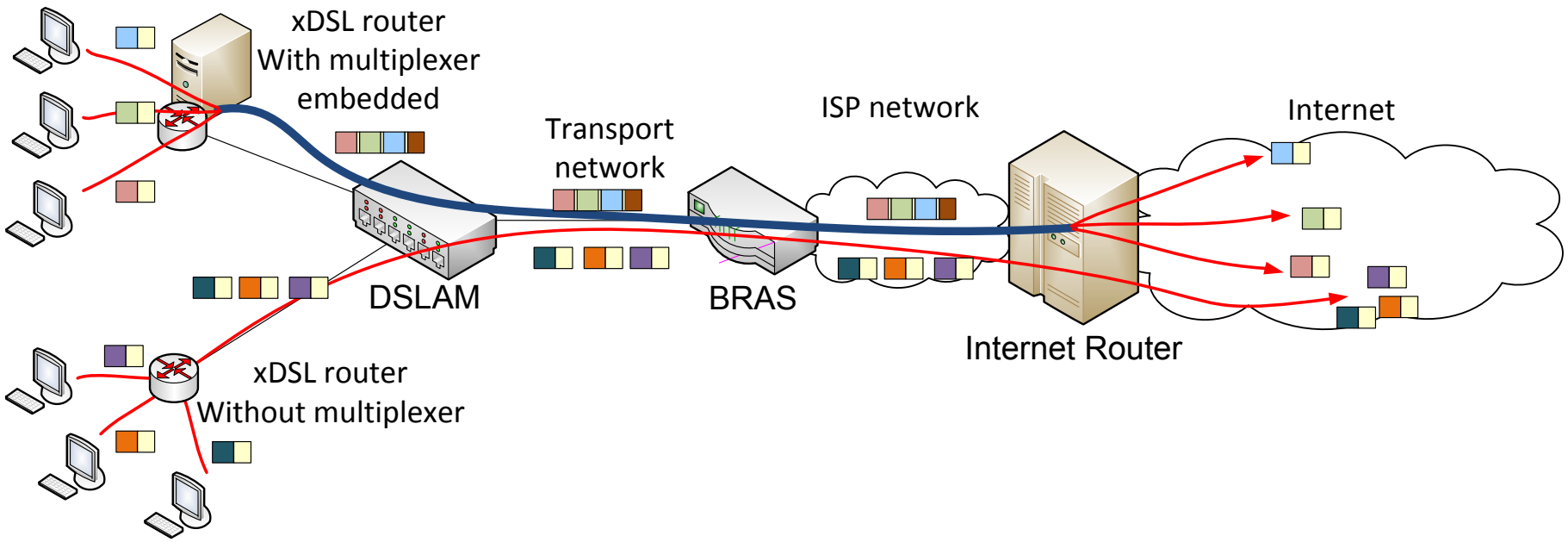
TCM-TF scenarios

Corporate environments: End-to-end optimization



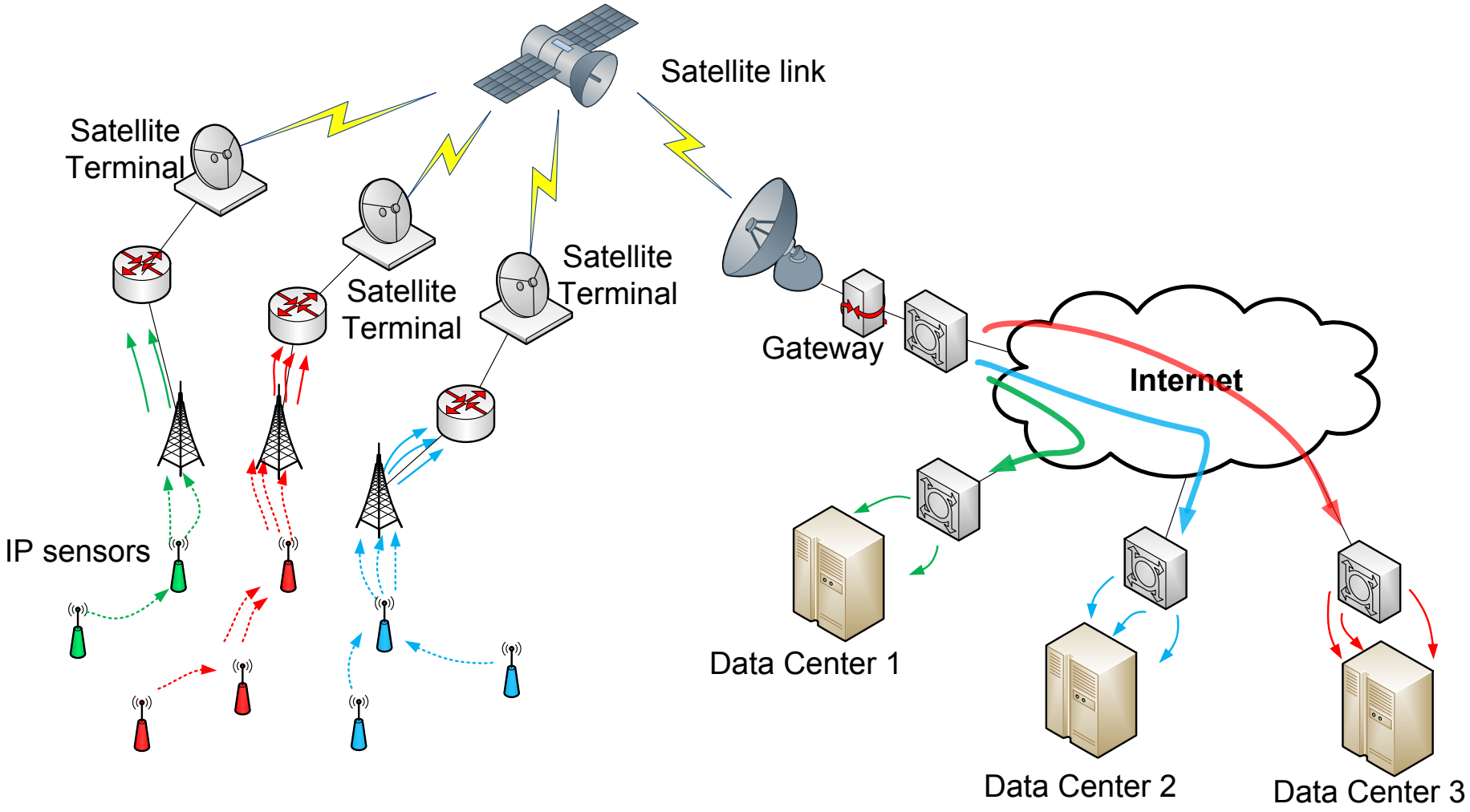
TCM-TF scenarios

Corporate environment: collaboration residential router-network operator



TCM-TF scenarios

Machine to machine



Dynamic or Permanent Optimization, History of TCRTP, and Standardization

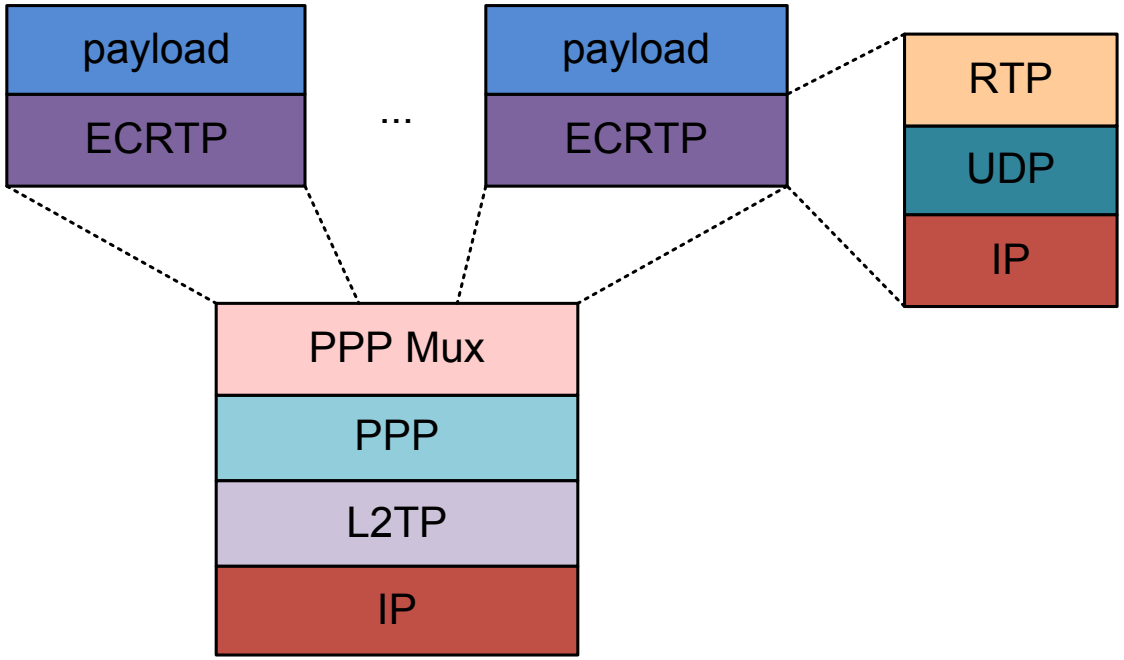
Dynamic or Permanent Optimization

- Dynamic: react to a momentary issue (network flexibility)
  - avoid dimensioning the network for the worst case
  - traffic surge (flash crowd)
- Permanent: always save bandwidth and pps
  - satellite connections
  - permanent bandwidth scarcity (e.g., access link)

- CPU versus bandwidth tradeoff

Brief history of TCRTP (RFC4170)

- 2005
- VoIP bandwidth competing with VoAAL (ATM)
- Simple combination of existing technologies
  - ECRTP, PPPMUX, tunnel



From TCRTP to TCM-TF

- TCRTP was expedient, not optimal
- Better header compression techniques (e.g., ROHC)

- Need for **widening the scope** of TCRTP:
  - Beyond RTP
  - Incorporate improved header compression
  - More efficient multiplexing
  - Other tunneling protocols

Why standardize TCM-TF?

One of the options is already standardized

ECRTP-PPPMux-L2TP (TCRTP, RFC4170)

A number of stakeholders are involved, and they can obtain mutual benefits, so a standard is needed

- Network operators (e.g., Internet cafe)
- ISPs
- Content providers (e.g., gaming company)
- Enterprises
- End users

Transport Area

- Three possibilities: (1) RAI, (2) Internet, or (3) Transport Area

  L2TPv3: Internet Area (RFC 3931, March 2005)

  PPPMux: Internet Area (RFC 3153, August 2001)

  ECRTP: RAI Area (RFC 3545, July 2003)

  ROHC: Transport Area, although it can also compress RTP (RFC 5795, March 2010)

1) RAI: TCM-TF is about real-time services, but also non-RTP
2) TCM-TF is “end-to-edge” or “edge-to-edge”, thus TSV

- Transport area is closest fit

New Working Group

Inside TSVWG was our initial idea

However, a separate Working Group would improve focus

TCM-TF related links

- mailing list: tcmtf@ietf.org, https://www.ietf.org/mailman/listinfo/tcmtf
- Description draft: draft-saldana-tsvwg-tcmtf
- Recommendations draft (maximum added delays and classification methods): draft-suznjevic-tsvwg-mtd-tcmtf
- Related publications:
  - *First Person Shooters: Can a Smarter Network Save Bandwidth without Annoying the Players?*, IEEE Communications Magazine, vol. 49, no.11, pp. 190-198, November 2011
  - *Widening the Scope of a Standard: Real Time Flows Tunneling, Compressing and Multiplexing*, IEEE ICC 2012, Workshop on Telecommunications: from Research to Standards, June 10-11, 2012, Ottawa, Canada.
  - *Traffic Optimization for TCP-based Massive Multiplayer Online Games*, Proc. International Symposium on Performance Evaluation of Computer and Telecommunication Systems SPECTS 2012, July 8-11, 2012, Genoa, Italy
  - *Evaluating the Influence of Multiplexing Schemes and Buffer Implementation on Perceived VoIP Conversation Quality*, Computer Networks (Elsevier), Volume 56, Issue 7, Pages 1893-1919, May 2012, http://dx.doi.org/10.1016/j.comnet.2012.02.004