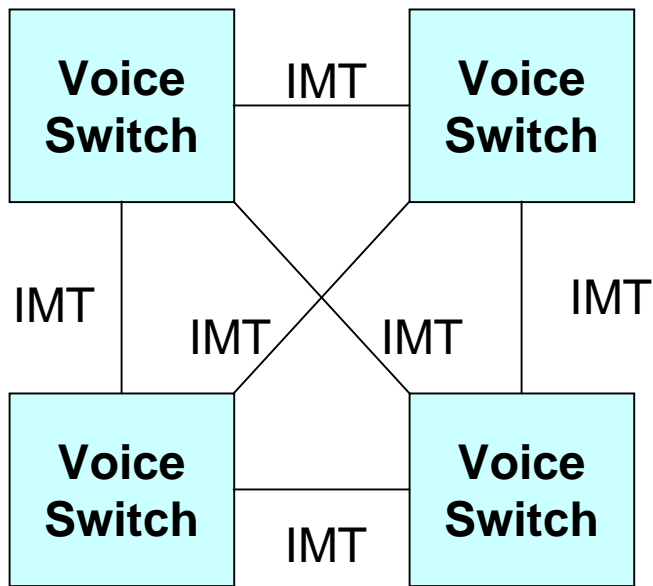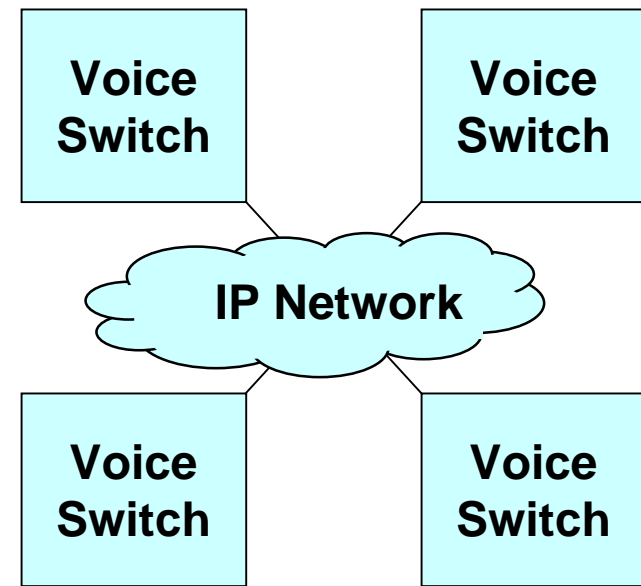# Carrier Issues for RTP Trunking

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Why RTP Trunking?

TDM to Packet Transition

**Conventional Inter-Machine Trunks
(Bundled DS-3s)**

**RTP over IP Trunks
(IP to OC-48or more)**

Trunking Assumptions

- Relatively large numbers of streams between device pairs.
  - Adequate number of parallel streams to fill out packets, no more than one sample per stream per packet.
- Fast interfaces with minimal serialization delay.
  - Minimal (O^n) packet latency in bit times.
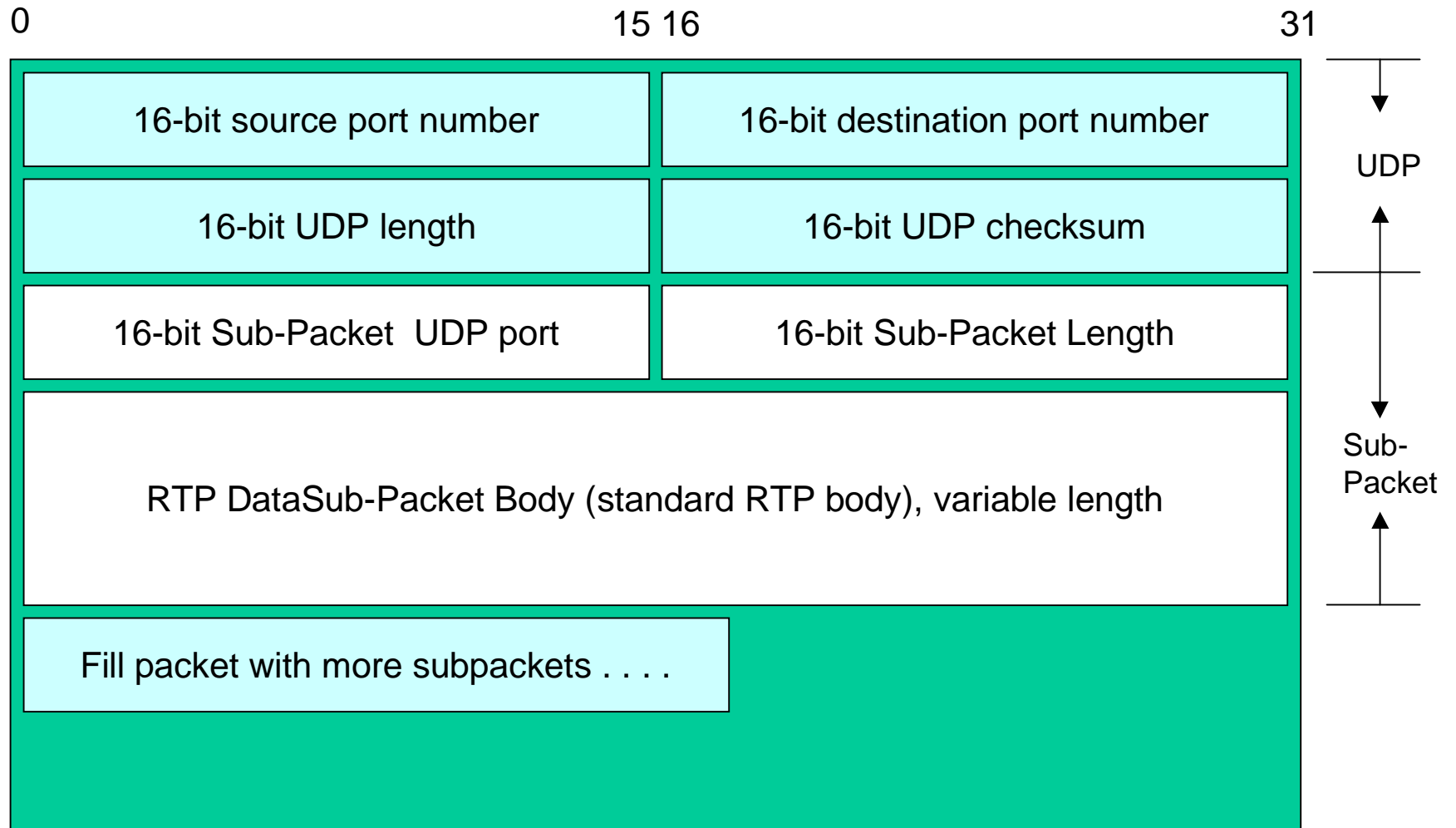- Mixed codecs with silence suppression.

Muxing Goals

- Overall: Increase "network efficiency"
  - G.711/RTP/UDP/IP/ATM/SONET is 5%.
  - Increase to 10% doubles capacity . . .

- Technique: repack to use full MTU and reduce number of packets.
  - Per-packet switching overhead increases switching costs.
  - Per-packet header overhead wastes bandwidth (40 bytes per packet, more with IPSEC).
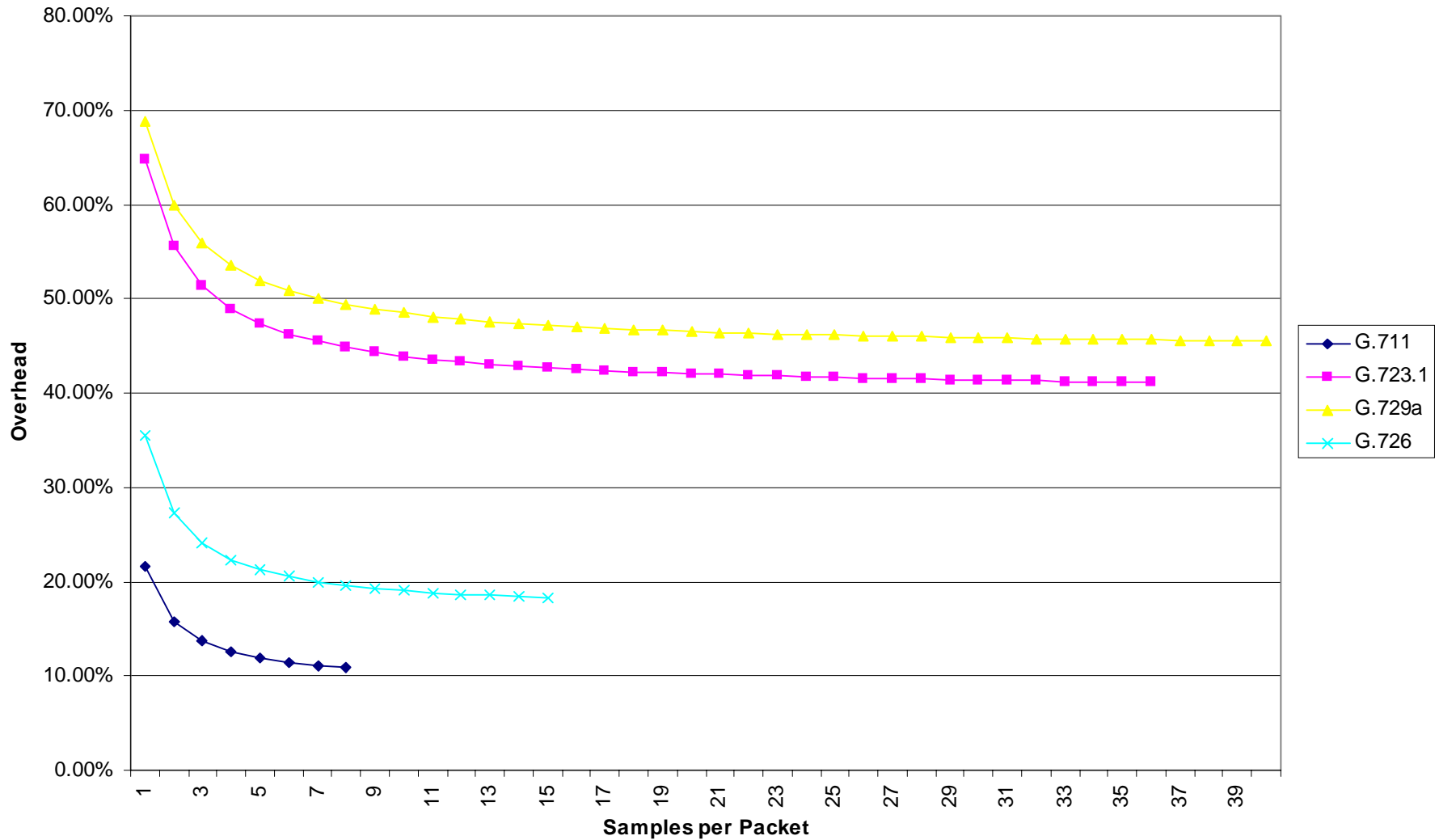
Muxing Alternatives

- ## RTP level
  - – Uses knowledge of RTP to pack densely
  - – Complex, requires changes to RTP, issues with RTCP
  - – No benefit to non RTP-traffic (fax, etc.)
- ## UDP level
  - – brute-force simplicity
  - – aggregates RTP, RTCP, and non-RTP
  - – allows IPSEC at mux level

Simple UDP Muxing of RTP

```
0                          15 16                         31
```

16-bit source port number	16-bit destination port number
16-bit UDP length	16-bit UDP checksum
16-bit Sub-Packet UDP port	16-bit Sub-Packet Length

UDP

RTP DataSub-Packet Body (standard RTP body), variable length

Sub-Packet

Fill packet with more subpackets . . . .

Muxing Reduces Overhead

Effect of Multiple Samples per Packet on Header Overhead

Questions

- Mux-packet assembly is inherently serial -- major CPU load. Can it be built efficiently?

- Mid-network muxing or remuxing is problematic. Do we need it?

- Is muxing really worth it? This depends on what REALLY happens to bandwidth availability and packet switch capacity.

- Impact of IPSEC and IPV6 headers.