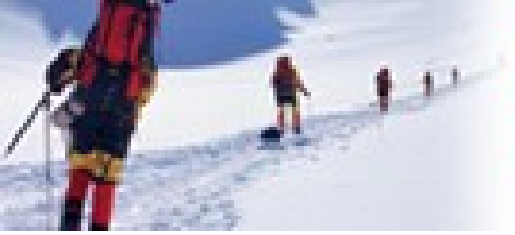


Data Communications and Networking Fourth Edition

Forouzan

Chapter 18

虚电路网络：帧中继和 ATM

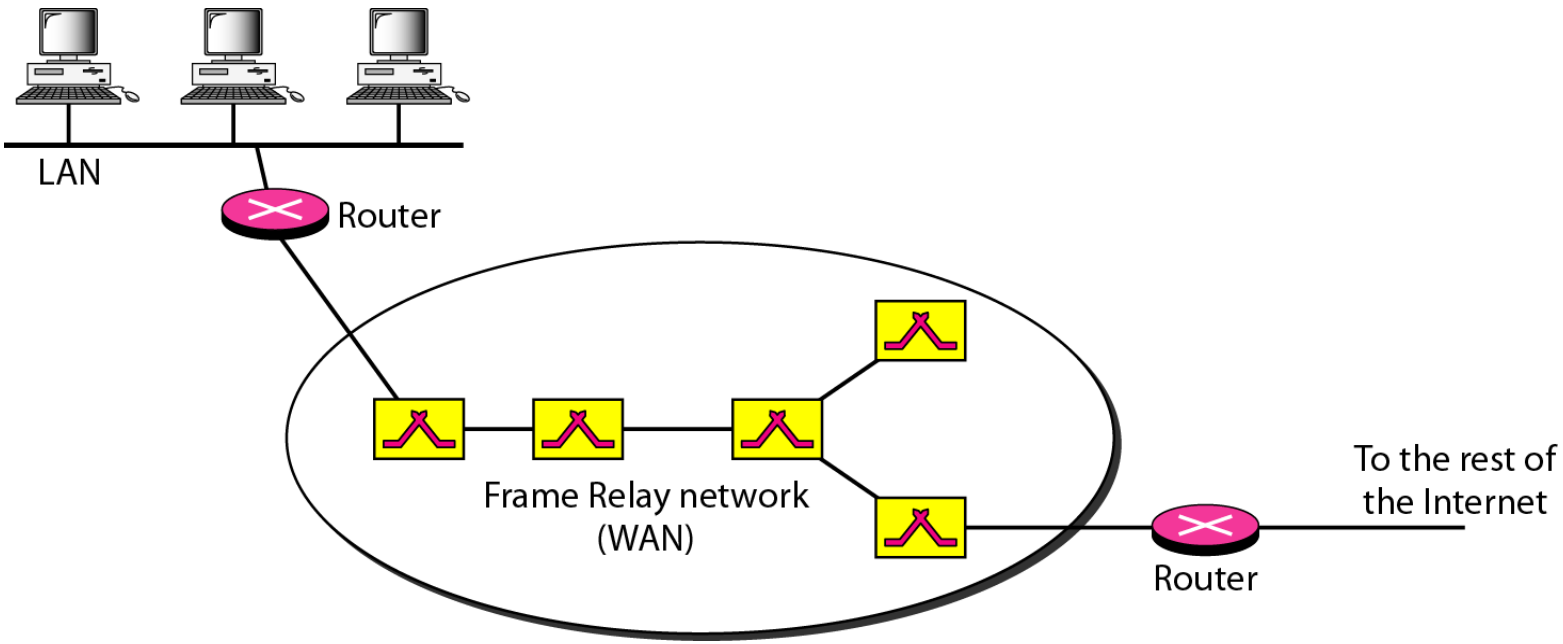
18-1 帧中继

帧中继 (Frame Relay) 是一种虚电路广域网，设计用来满足在 20 世纪 80 年代末期到 90 年代早期对新型广域网的需求 .

Topics discussed in this section:

体系结构 Architecture
帧中继层 Frame Relay Layers
扩展地址 Extended Address
帧中继组装器 / 分解器 FRAD (Frame Relay assembler/disassemble)
帧中继语音 VOFR (Voice Over Frame Relay)
本地管理信息 LMI (Local management information)

Figure 18.1 帧中继网络

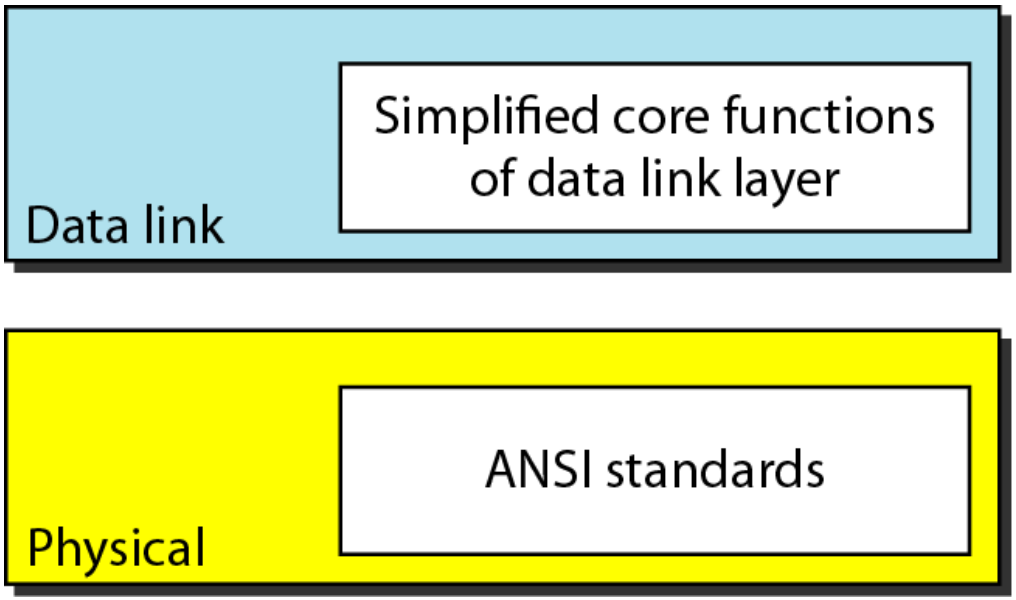


Note

帧中继中的 VCI 称为 DLCI 。

虚电路标识符　**VCI (Virtual Circuit Identifier)**
数字链路连接标识符　**DLCI (Data Link Connection Identifier)**

Figure 18.2 帧中继层



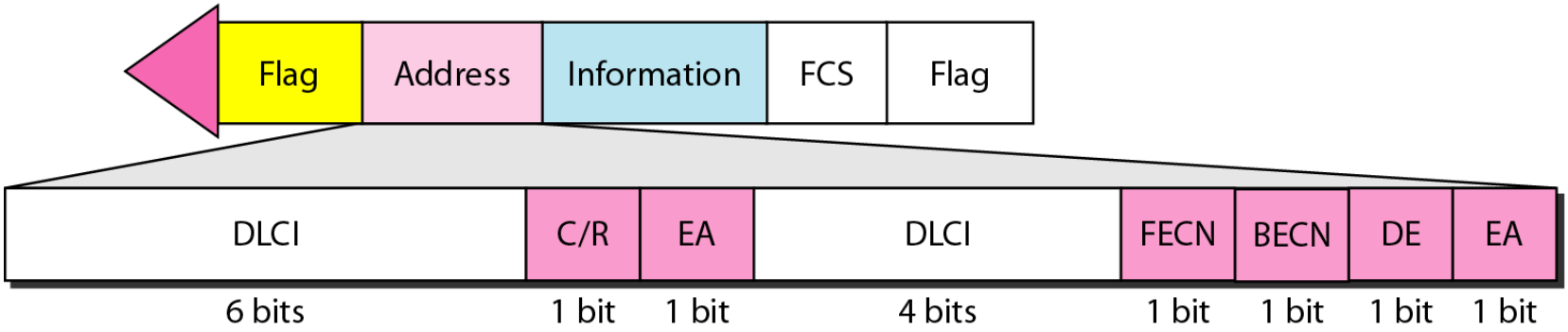
Note

帧中继仅工作在物理层和数据链路层。

Figure 18.3 帧中继帧

C/R: Command/response
EA: Extended address
FECN: Forward explicit congestion notification

BECN: Backward explicit congestion notification
DE: Discard eligibility
DLCI: Data link connection identifier



Note

帧中继不提供流量和差错控制，
这些必须由上层协议提供。

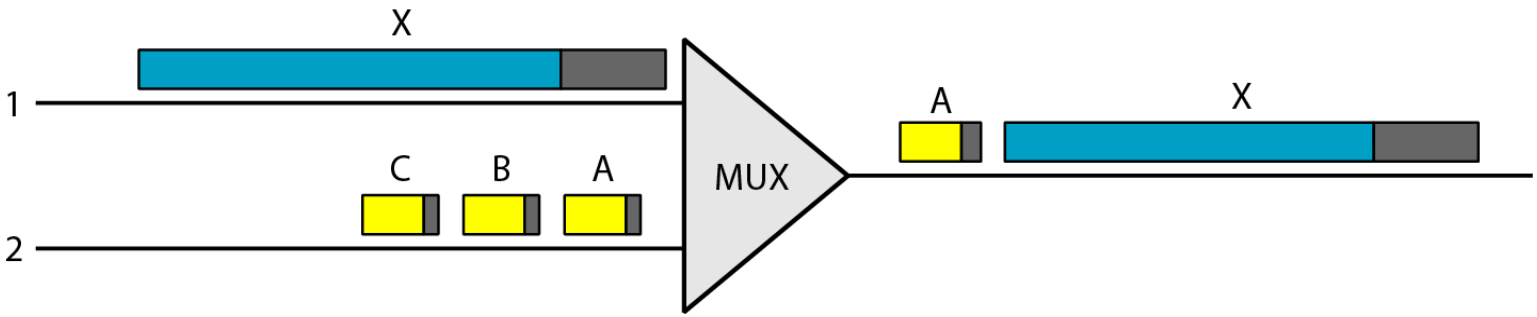
18-2 ATM

异步传输模式 (Asynchronous Transfer Mode, ATM) 是由 ATM 论坛设计的信元中继 (cell relay) 协议，并被 ITU-T 采纳 .

Topics discussed in this section:

设计目标 Design Goals
问题 Problems
体系结构 Architecture
交换 Switching
ATM 层 ATM Layers

Figure 18.6 使用不同帧大小的复用



Note

信元网络使用信元作为数据交换的基本单位，信元定义为一个小的、固定大小的信息块。

Figure 18.7 使用信元的多路复用

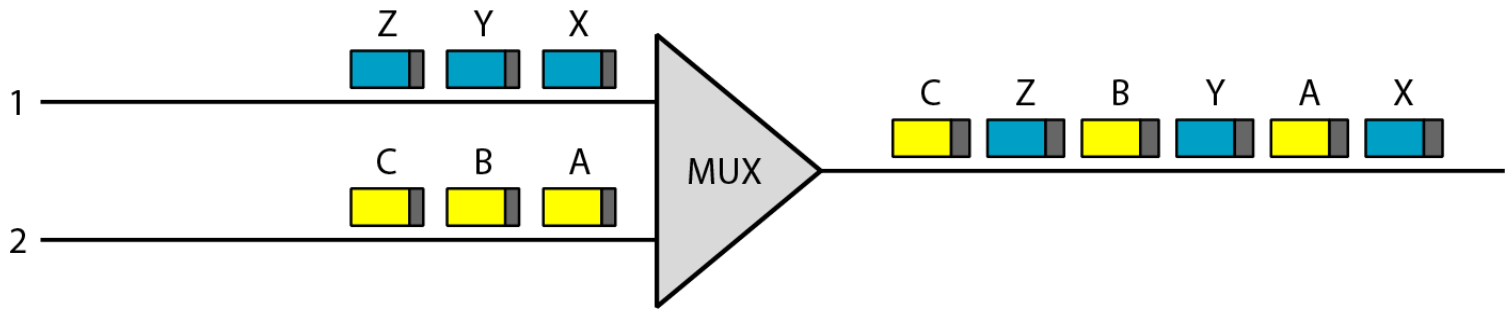


Figure 18.8 ATM 复用

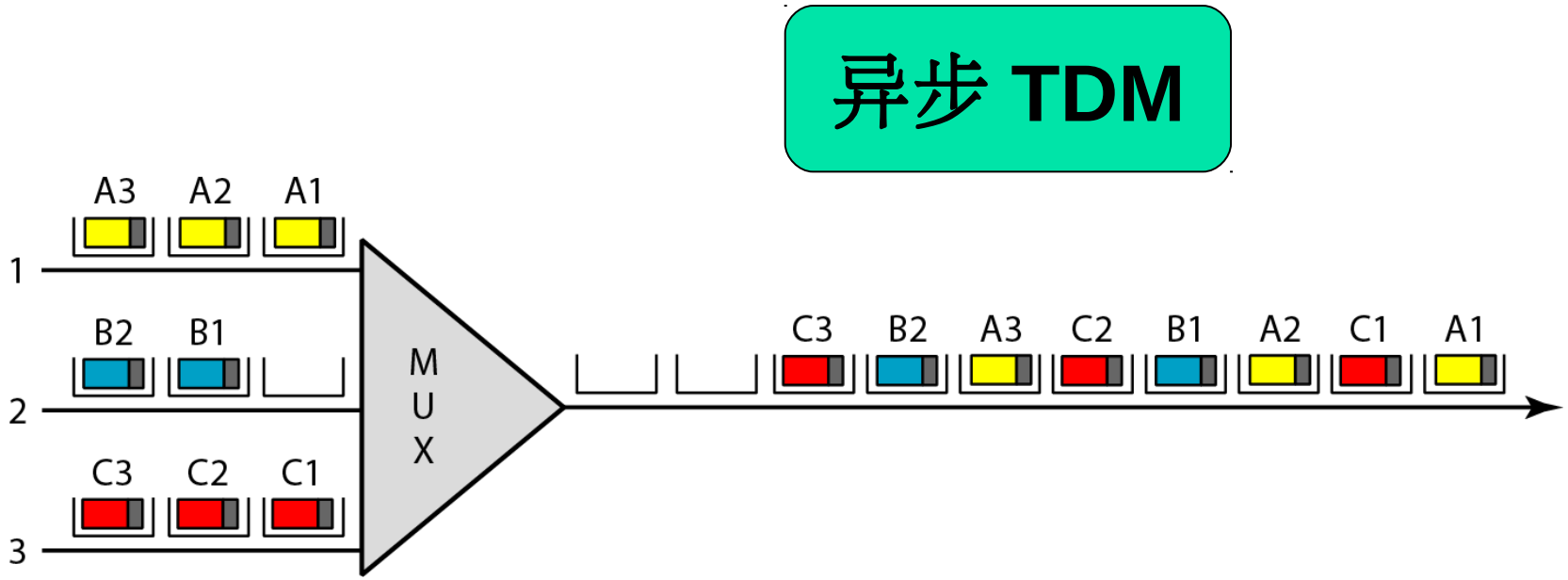
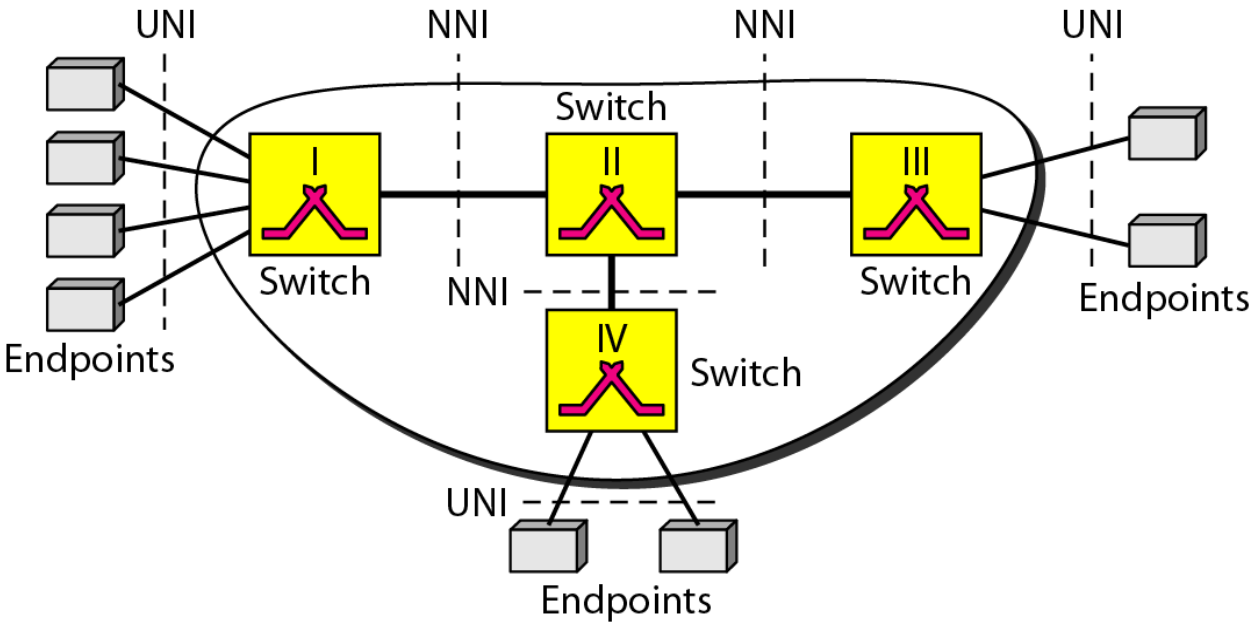
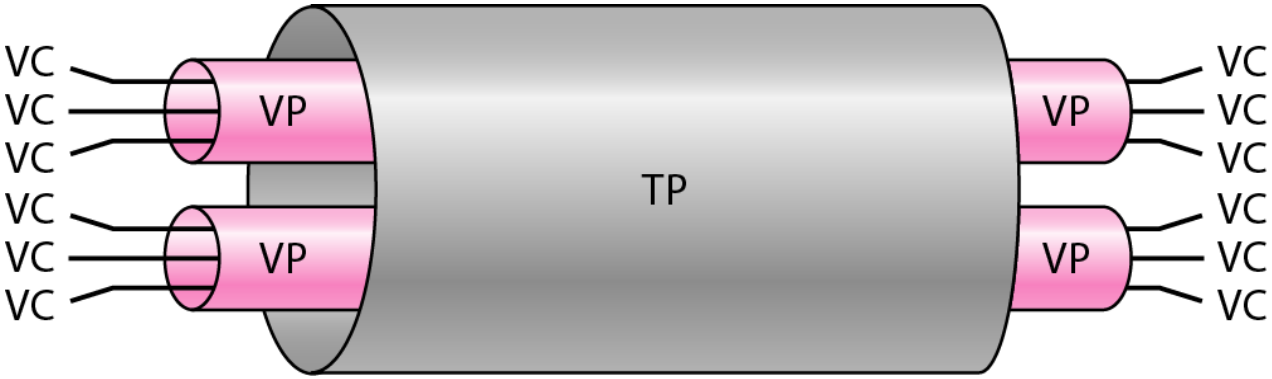


Figure 18.9 ATM 网络的体系结构



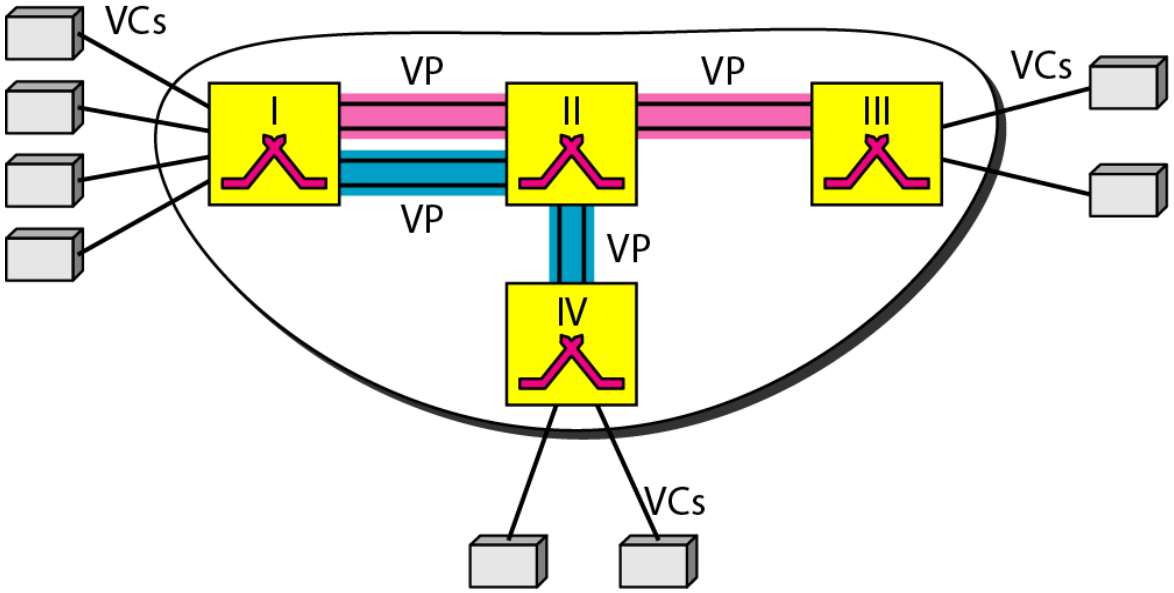
用户到网络接口 **UNI** （**User-to-Network interface**）
网络到网络接口 **NNI** （**Network-to-Network interface**）

Figure 18.10 TP 、 VP 和 VC



传输路径 **TP** （**Transmission path**）
虚路径 **VP** （**Virtual Path**）
虚电路 **VC** （**Virtual Circuit**）

Figure 18.11 VP 和 VC 的例子



Note

一个虚连接由一对数字定义：
VPI 和 **VCI** 。

Figure 18.12 连接标识符

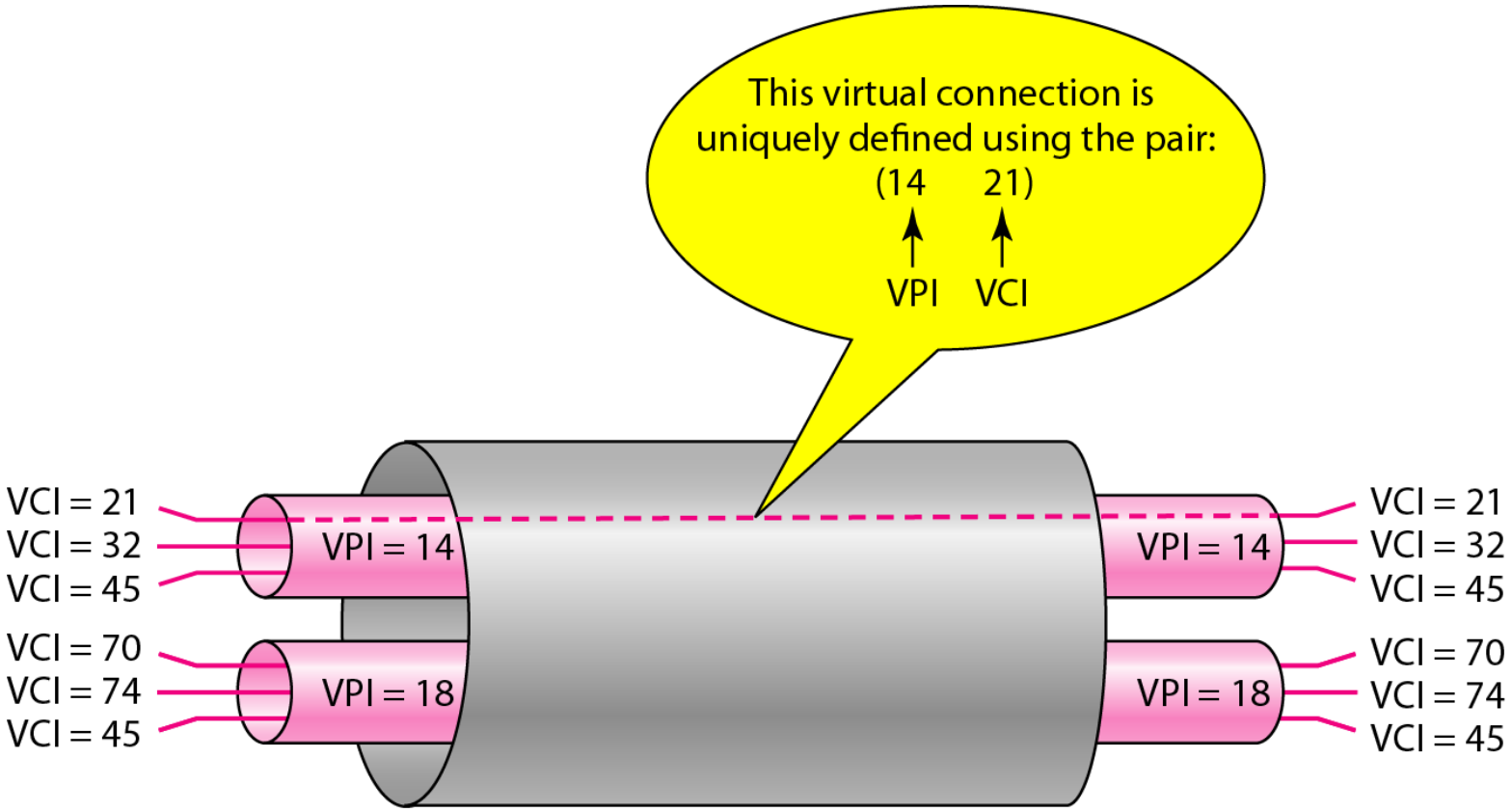
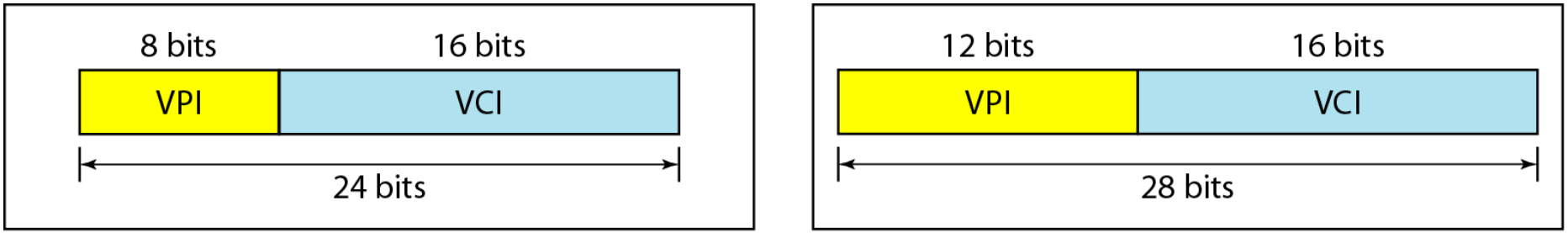


Figure 18.13 UNI 和 NNI 中的虚连接标识符



a. VPI and VCI in a UNI

b. VPI and VCI in an NNI

Figure 18.14 ATM 信元

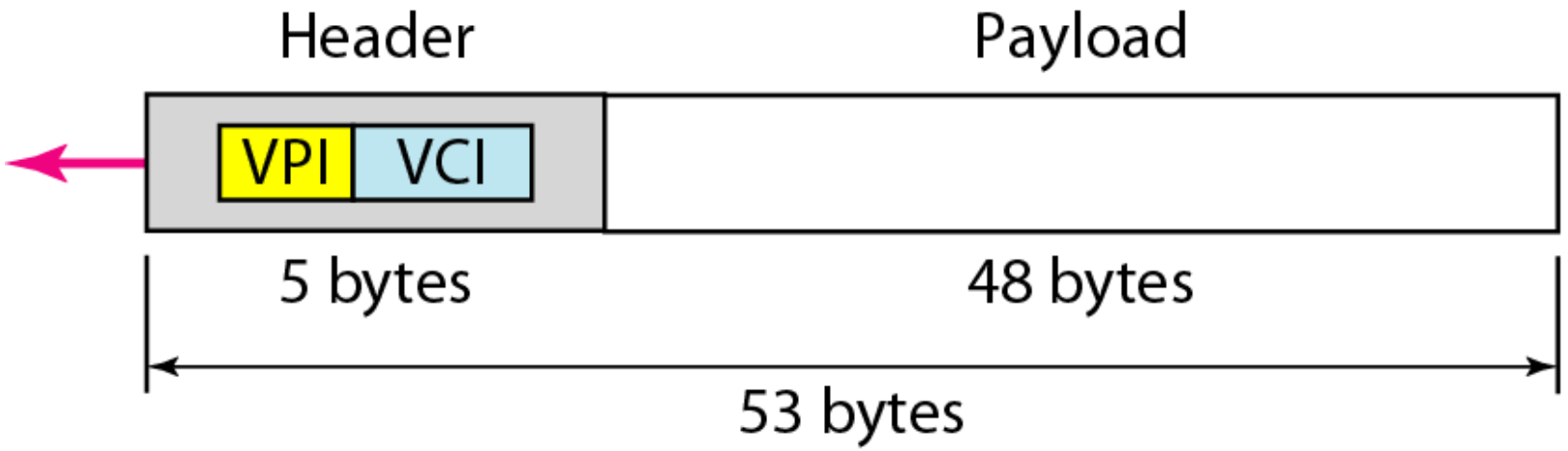


Figure 18.15 交换机的路由

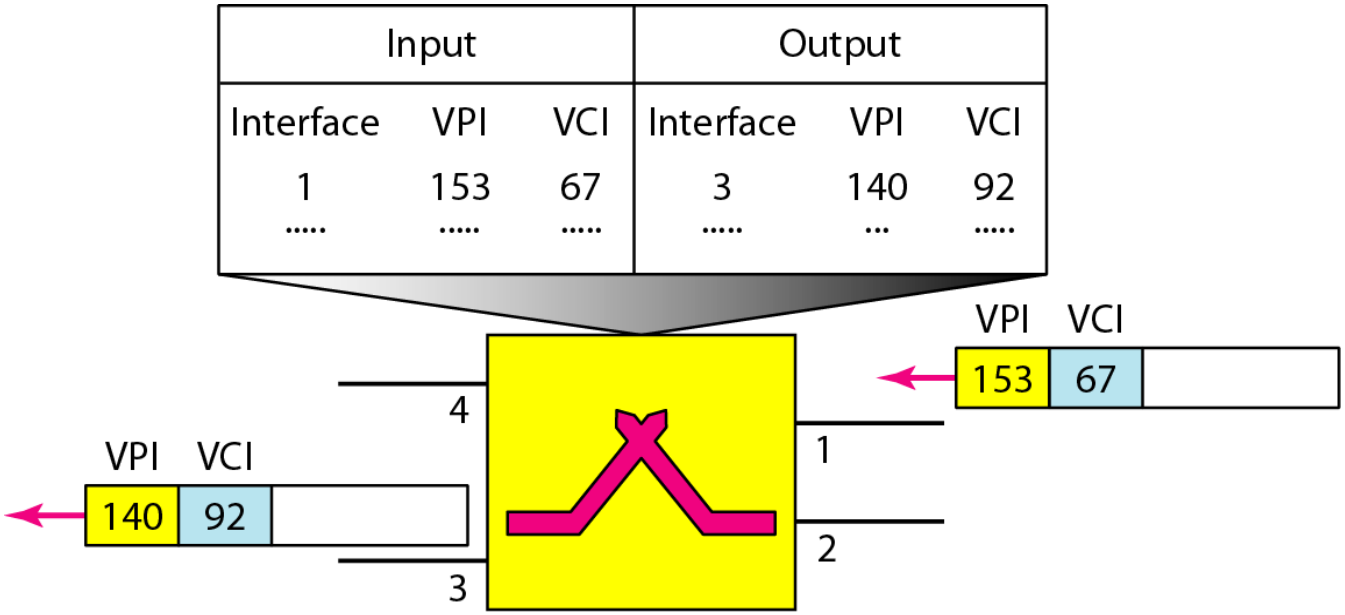


Figure 18.16 ATM 层

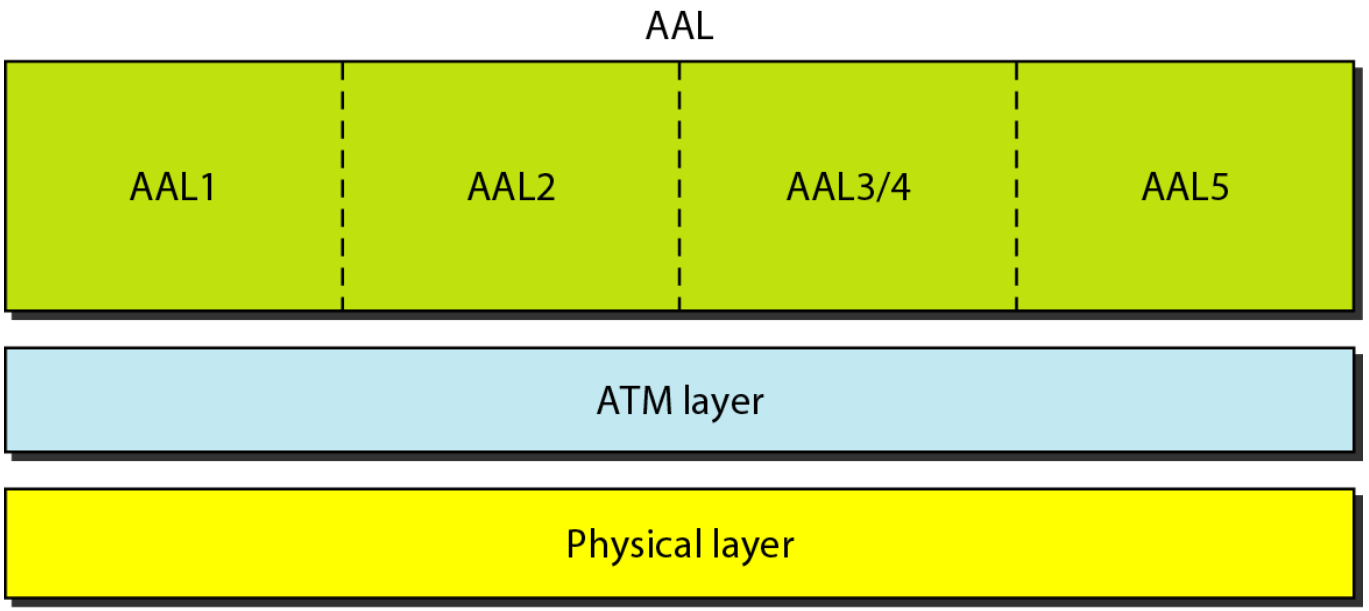


Figure 18.17 端设备和交换机中的 ATM 层

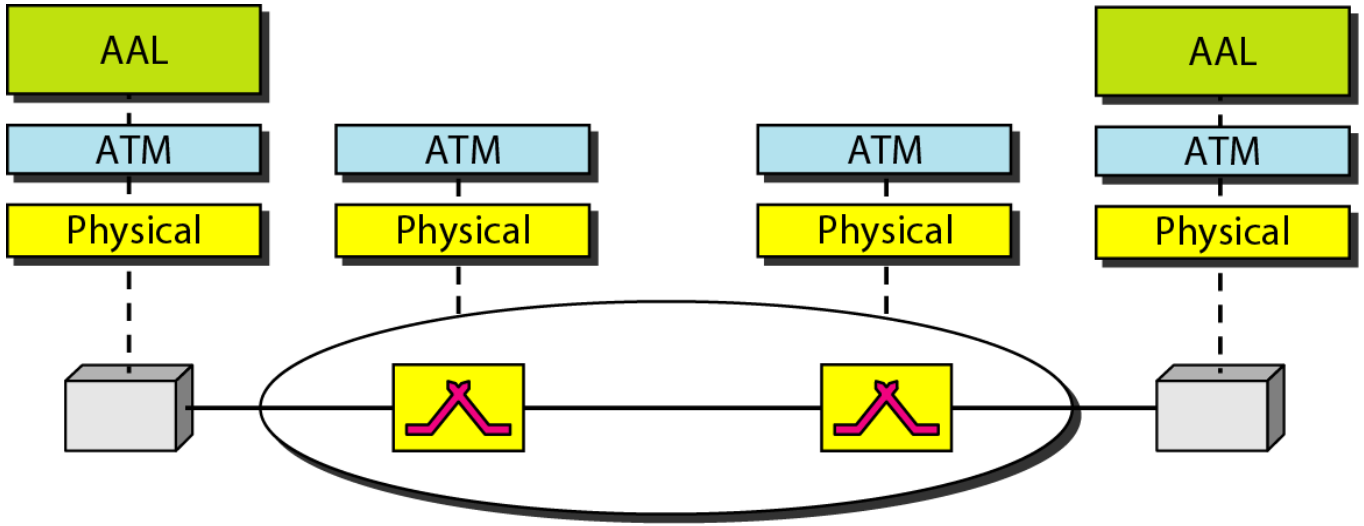


Figure 18.18 ATM 层

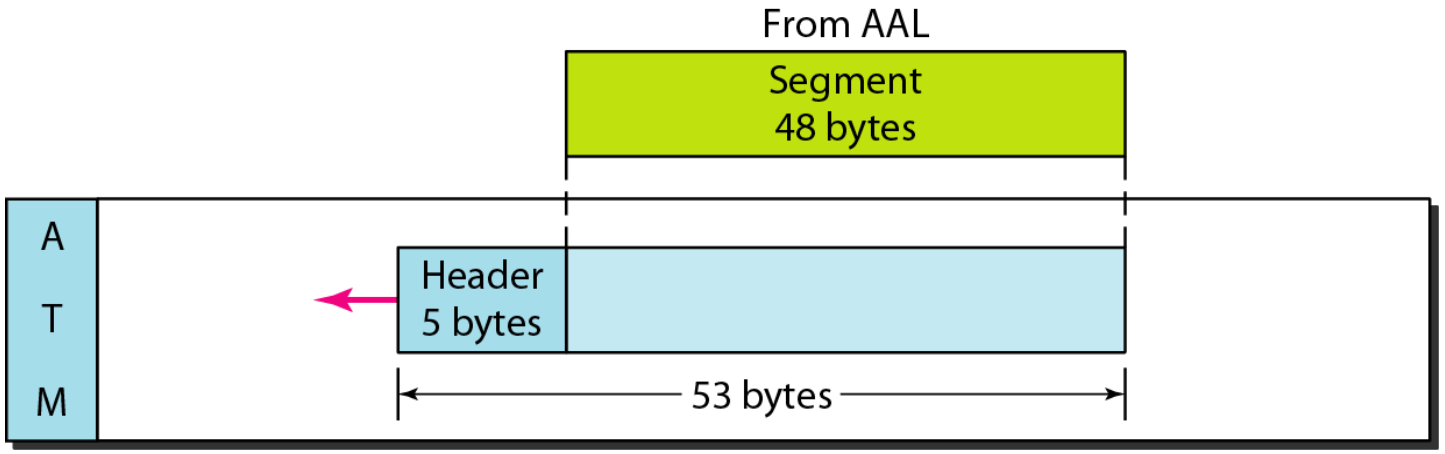


Figure 18.19 ATM 头部

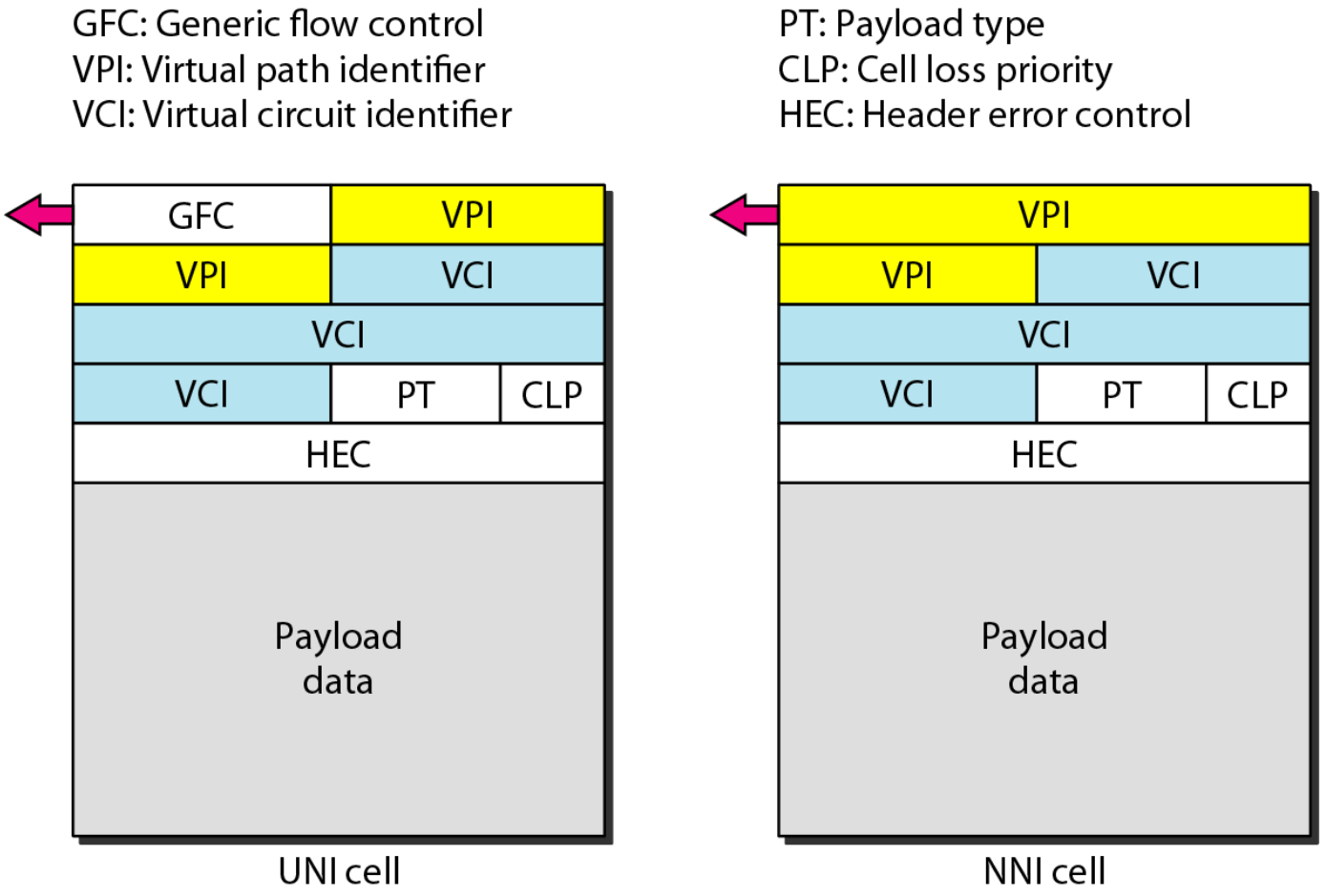
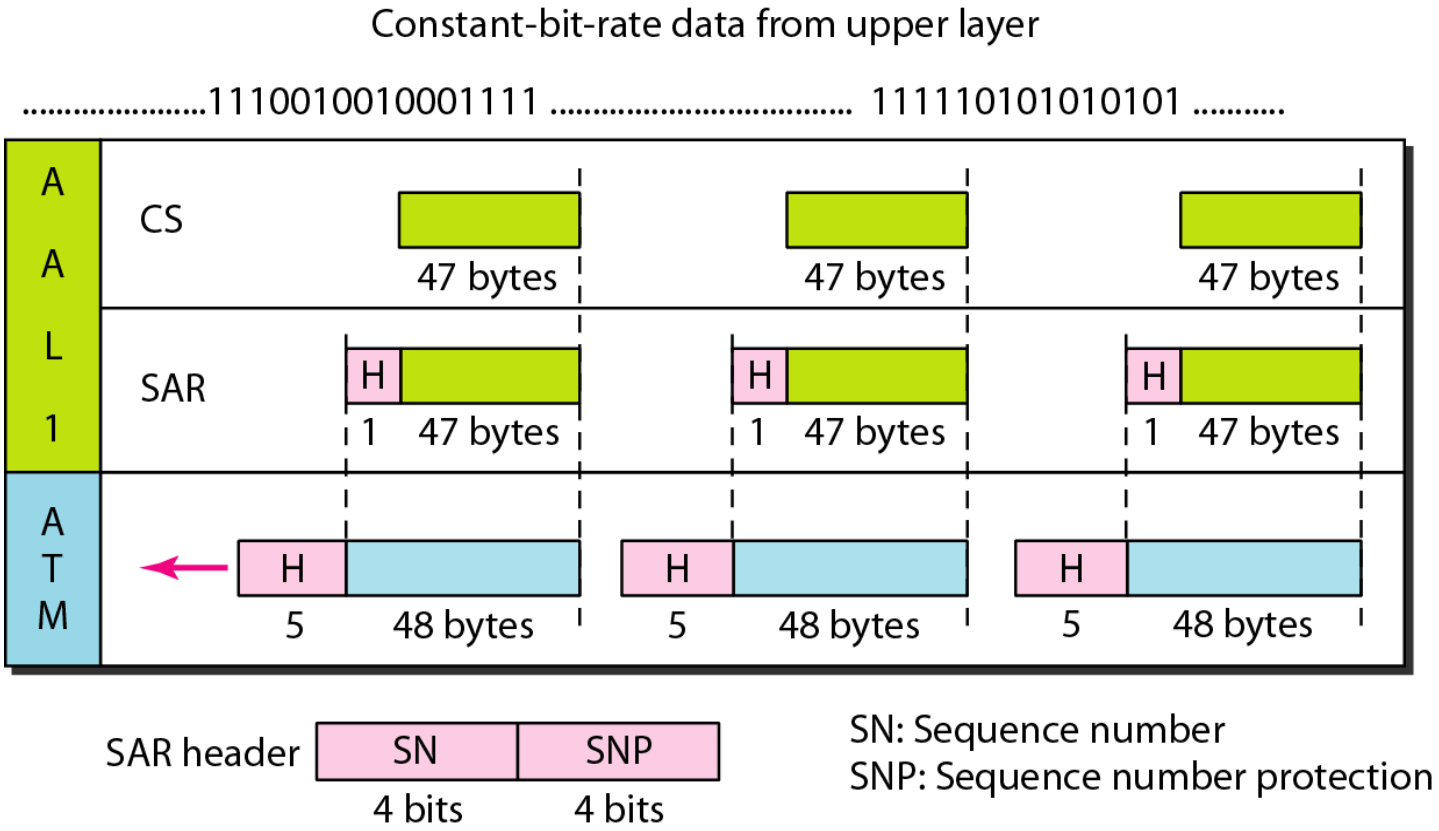


Figure 18.20 AAL1



会聚子层 **CS** （**convergence sublayer**）
分割与重组 **SAR** （**segment and reassembly**）

Figure 18.21 AAL2

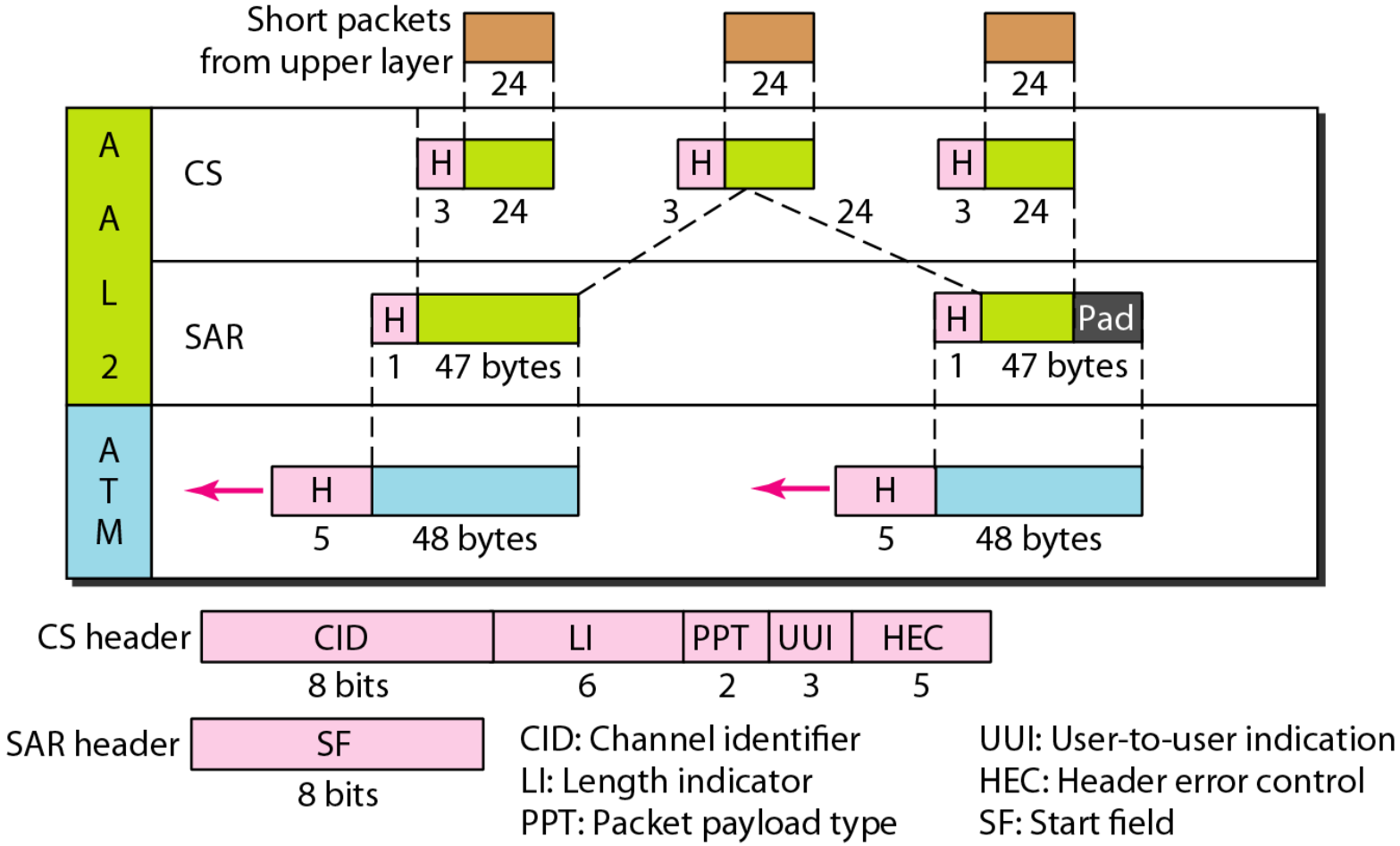


Figure 18.22 AAL3/4

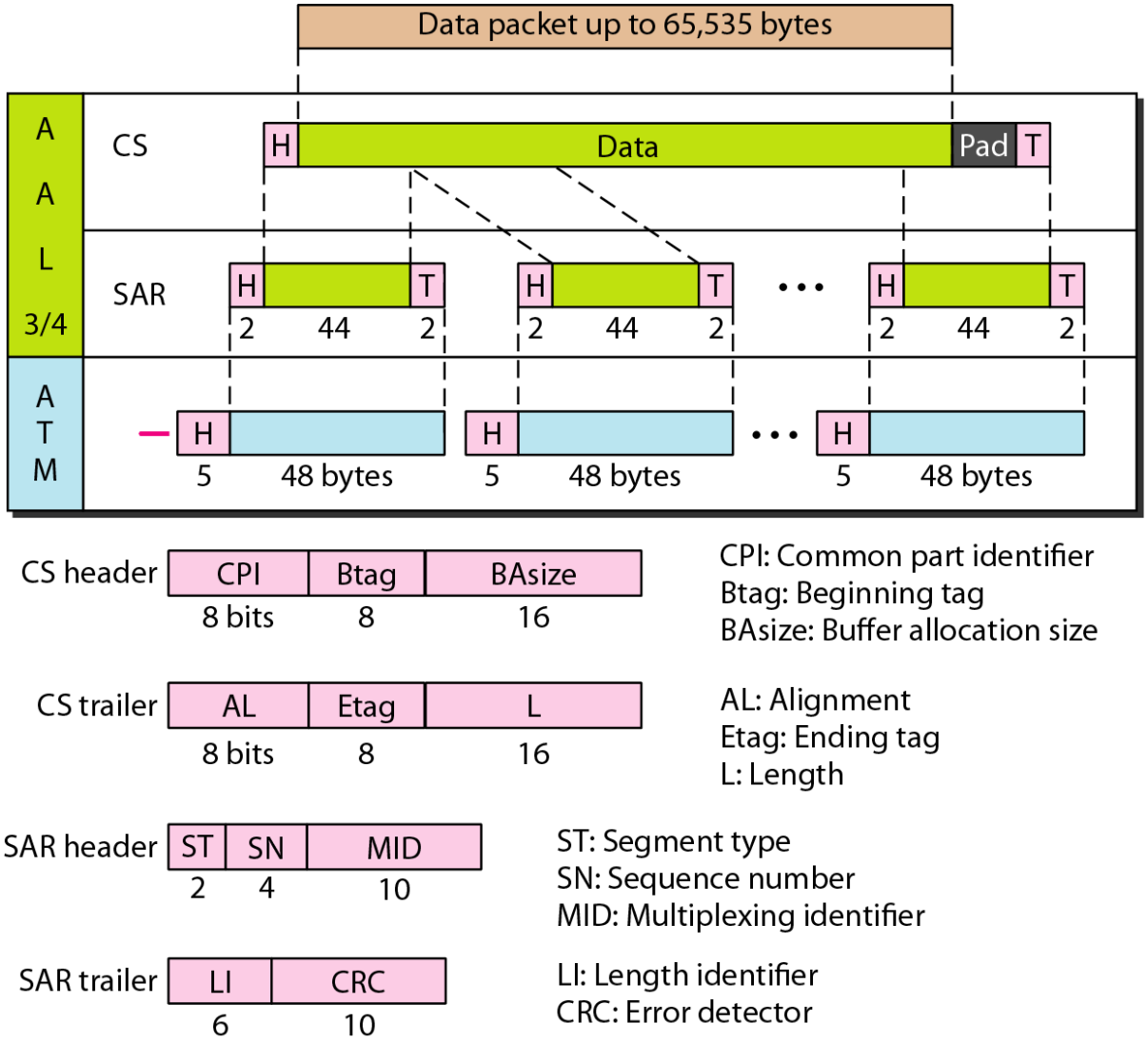
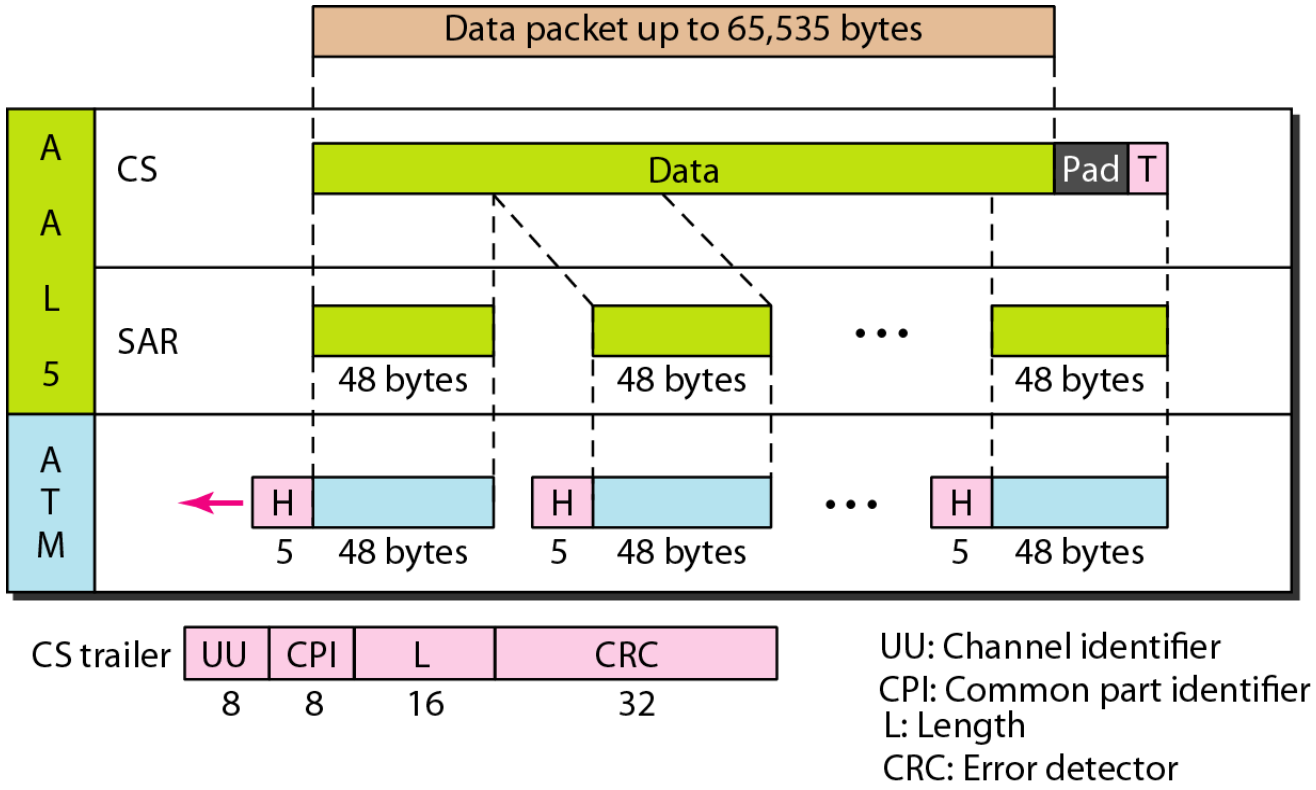


Figure 18.23 AAL5



作业

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