Common Infrastructure Requirements of the Generic Data Communications Services Models

Roy Bynum
Global Access Technology Development
WorldCom

IEEE 802.3 EFM Interim Meeting
May 2001

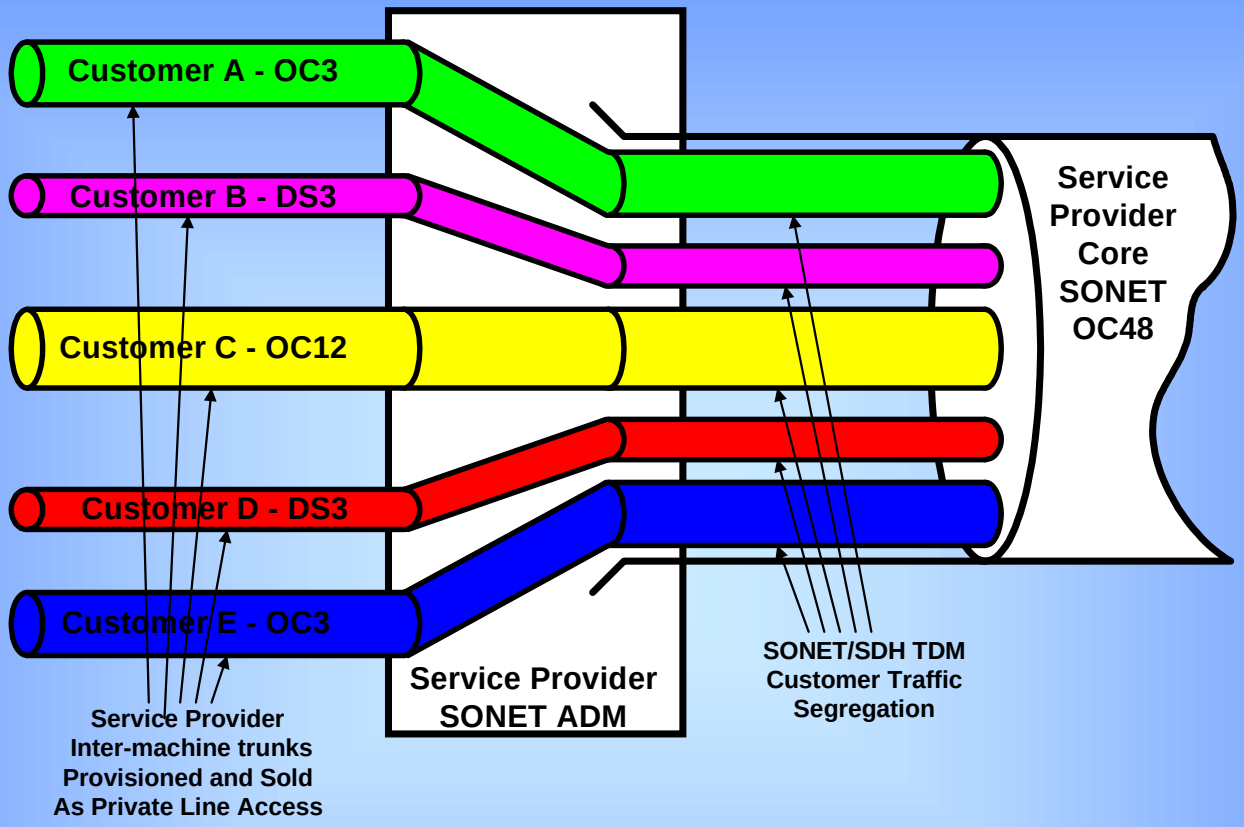
The Data Com Services

- The 4 major data communications services are
  - **Private Line**
  - **Virtual Private Line**
  - **Best Effort**
  - **Virtual Private Networking**
- Other services that may be put on top of one these, such as WEB hosting, IP Voice, Video, etc. on top of the Best Effort or Virtual Private Networking are content services, not communications services

Service Model Characteristics

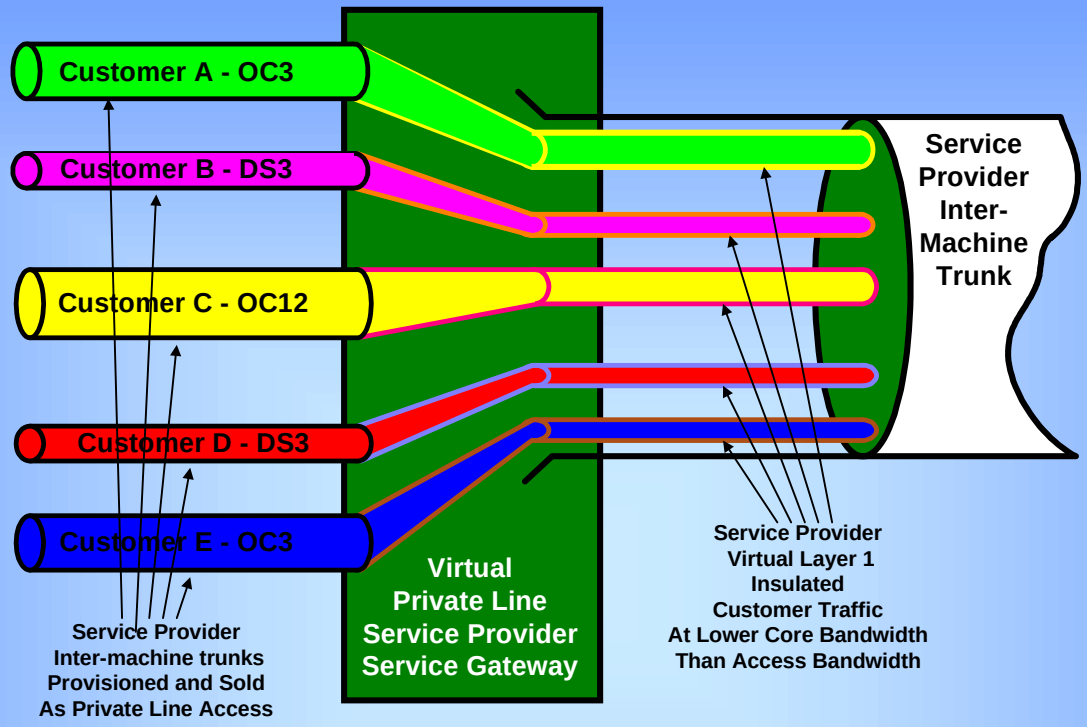
- **Each has distinct <u>Service Model Characteristics</u>**
- Connection type: connection or connectionless
- Bandwidth type: fixed or burstable w/CIR, or variable
- Infrastructure level: layer on the OSI stack
- Availability: uptime
- Reliability: # of errors, dropped data packets/frames
- Stability: latency variance between packets/frames
- Security: data com traffic segregation
- Routing autonomy: variability through the infrastructure
- Operations/network management: out of band or in band
- Customer cost structure: cost of services delivered

Private Line Services



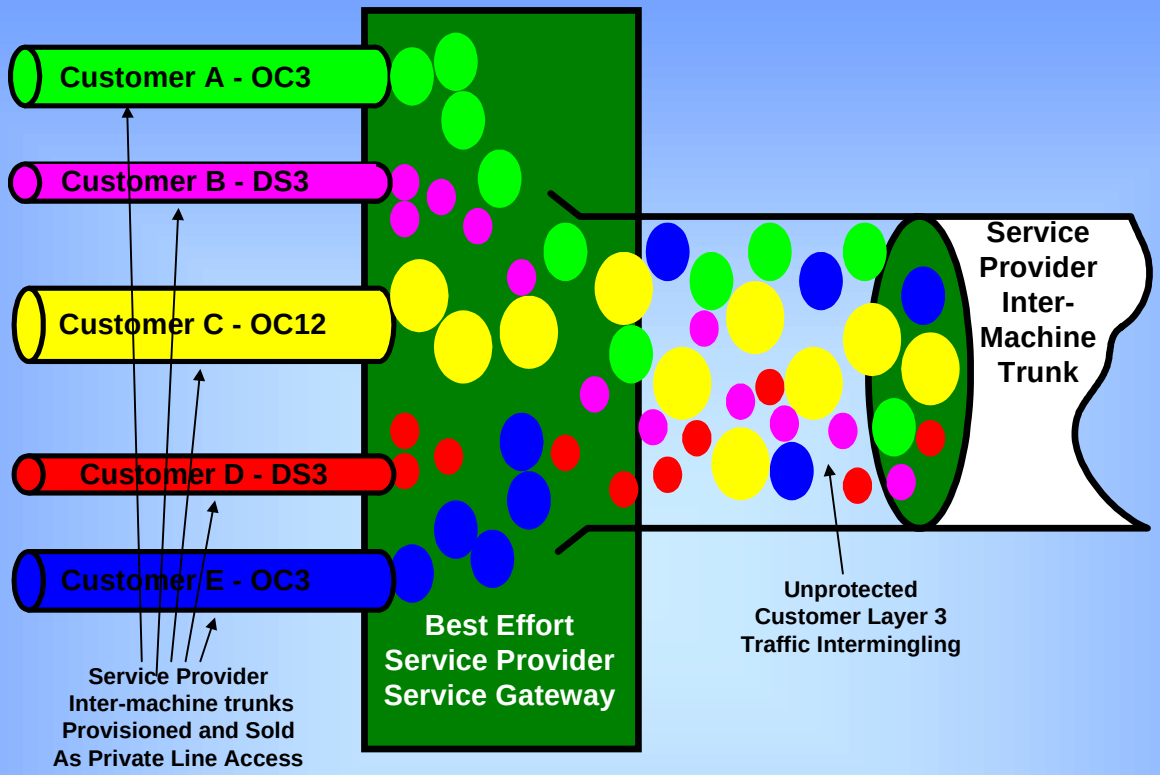
Connection Oriented, Layer 1 Service over Layer 1 Infrastructure, Fixed Bandwidth, High Security, High Reliability, High Availability, High Data Stability, Fixed Routing through Infrastructure, Out of Band Management, High Cost to Customer because of Distance Charges, High Margins to SP

Virtual Private Line Services



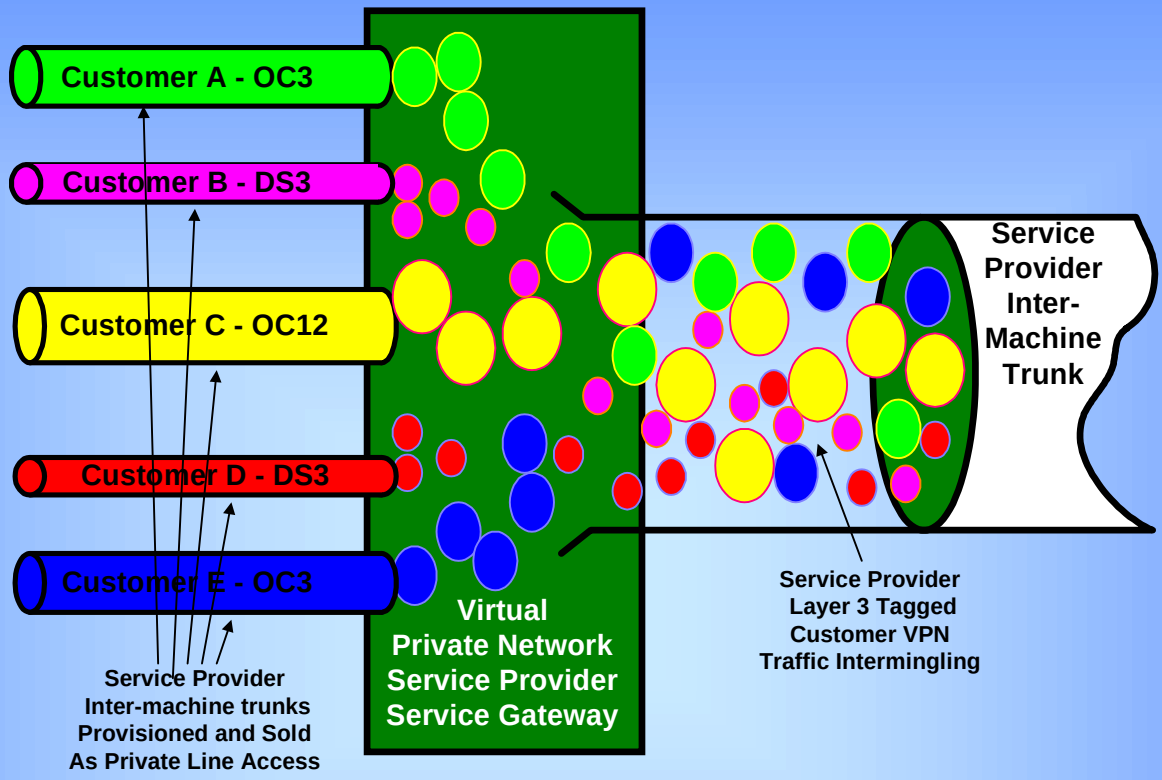
Connection Oriented, Layer 2 service over Virtual Layer 1 Infrastructure, Fixed and Burstable BE Bandwidth, High Security, Moderate to High Reliability, Moderate to High Availability, Moderate to High Data Stability, Implementation Specific Routing Autonomy, Moderate Cost to Customer without Distance Charges (only access distance charges), Moderate SP Margins

Best Effort Services



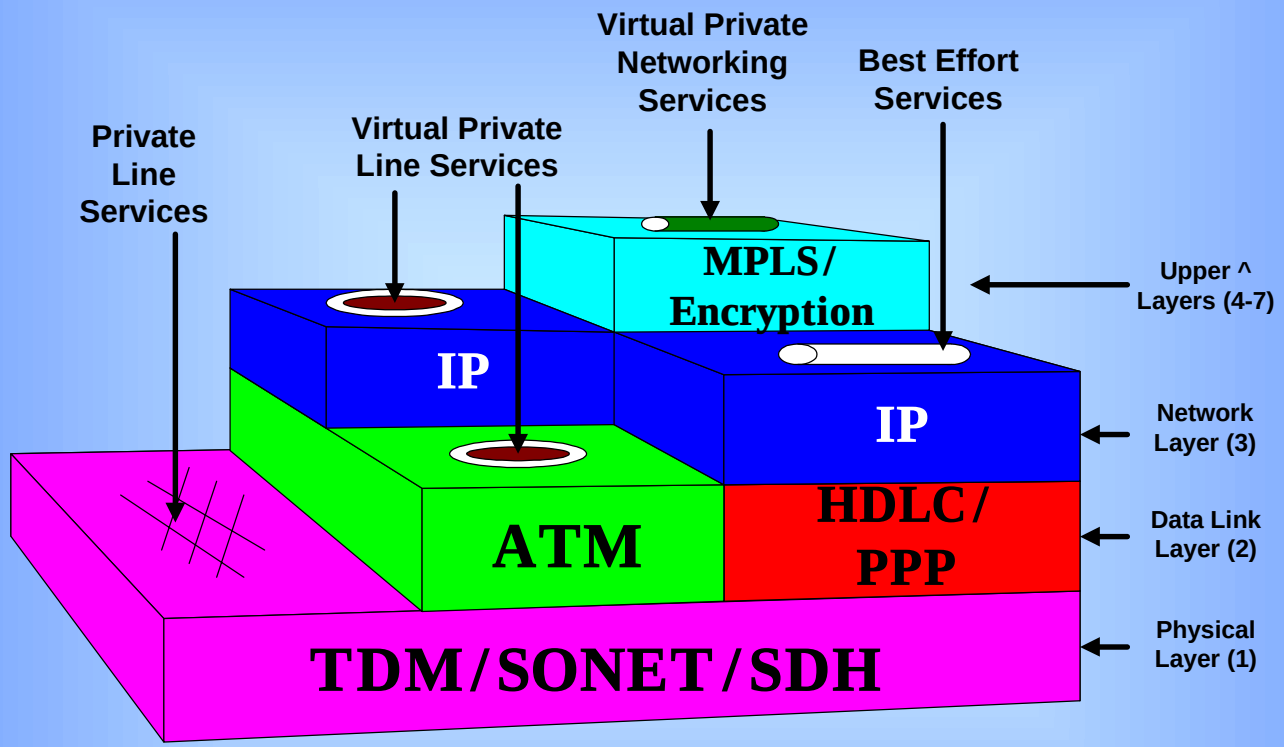
Non-Connection Oriented, Layer 3 service over Layer 3 Infrastructure, Burstable Bandwidth, Low Security, Low to Moderate Reliability, Low to Moderate Availability, Low Data Stability, Self-Autonomous Routing, Low Cost to Customer without Distance Charges (only access distance charges), Low/Negative SP Margins (often this service is subsidized by content services)

Virtual Private Networking Services



Semi-Connection Oriented, Layer 3 service over Layer 2/3 Infrastructure, Fixed and Burstable Bandwidth, Moderate Security, Moderate to High Reliability, Moderate Availability, Moderate Data Stability, Self-Autonomous Routing, Moderate Cost to Customer without Distance Charges (only access distance charges), Moderate Margins to Service Provider

All Major Current Services Operate Over The Same Physical Layer



This Is Possible Because The Physical Layer Provides The Reliable Basic Management Of The Common Physical Infrastructure

What is a Service?

- The service is what's billed for, not the infrastructure on which it sits.
- For example, Private Line Services bill for the use of the same infrastructure of inter-machine trunks that are used to provide communications connectivity for all other services. However, those other services do not bill directly for those same inter-machine trunks.

Common Points of Confusion

- Services have different meanings in the enterprise and telecom paradigms.
- In telecom, a service is what is billed for, not the infrastructure elements over which it is provided.
- The “Service Box” oxymoron: service creation box labels, when applied to hardware systems, are misnomers and are typically used by those with predominantly enterprise data com backgrounds.

SP Infrastructure: The Common Denominators for all Services

- Layer 1 functionality invariably is connection oriented
- Once the service is up and connection established, bandwidth is fixed, not variable, at Layer 1 ensuring guaranteed management & service rates.
- The Layer 1 signaling provides out of band (outside of customer bearing traffic) operations & services management functionality. This gives the SP the ability to put any service over the common infrastructure.

SP Infrastructure: The Common Denominators for all Services

- Infrastructure requires a clean, SP-managed demarcation to allow remote problem resolution on SP infrastructure while containing labor costs.
- The demarcation equipment/port between the customer and provider infrastructures is managed & sometimes owned by the SP.
- Both copper and fiber infrastructure Layer 1 needs to be simple and specific yet have the same operations & services management functionality

The Effect of Generic Service Models And Infrastructure Requirements On EFM Objectives

- EFM objectives should concentrate on SP Layer 1 infrastructure requirements.
- The marketability of services over EFM infrastructure may be included as part of the 5 criteria.