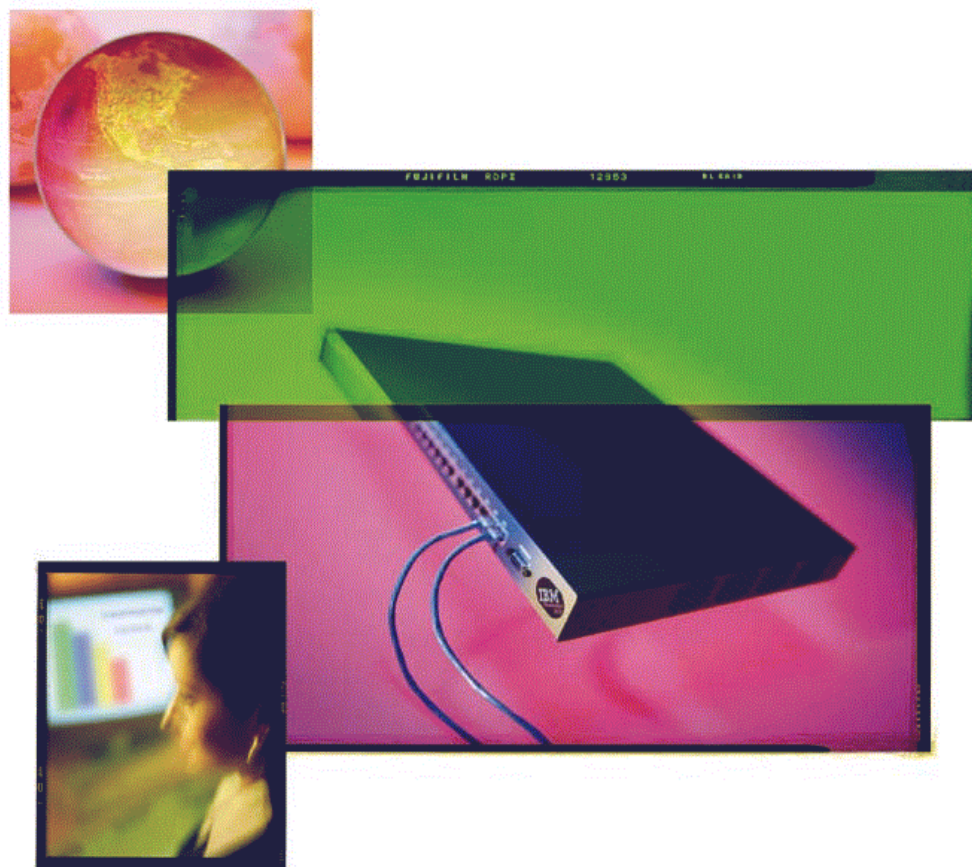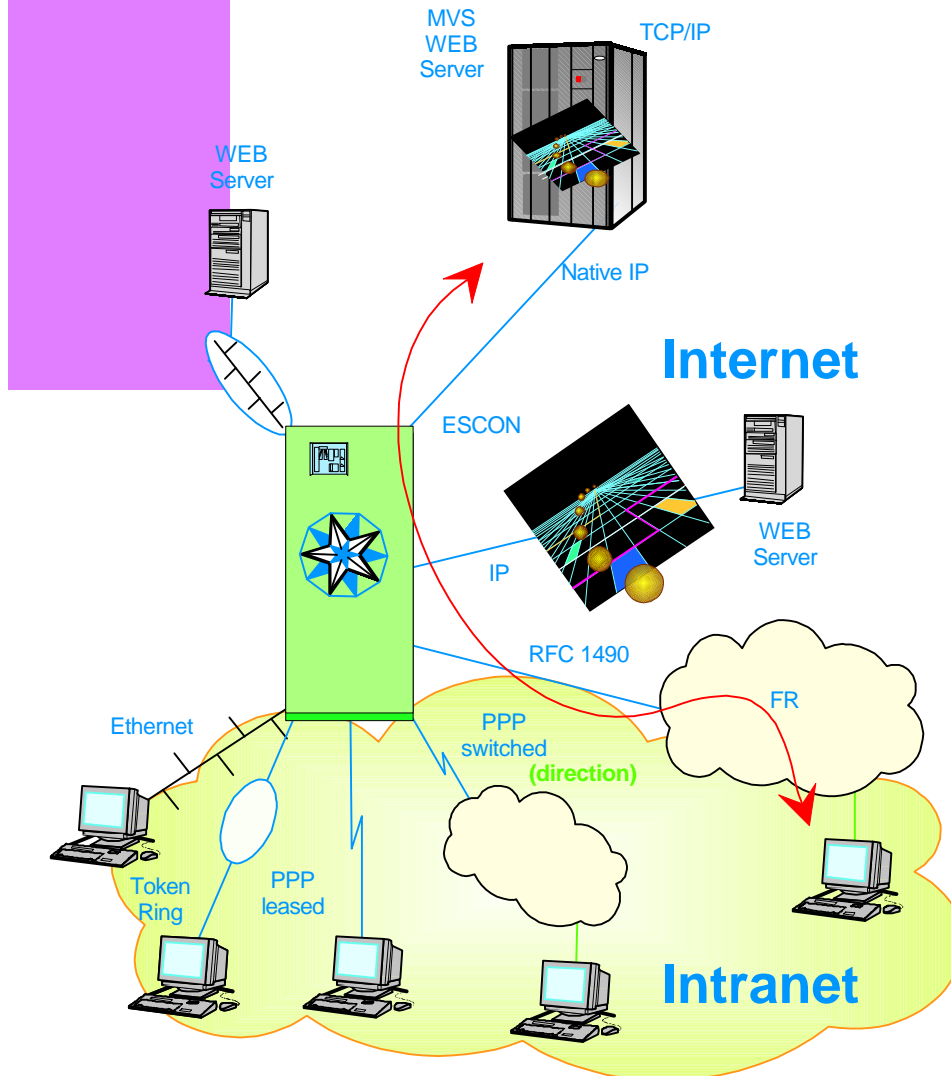IBM

IBM 3746 Nways Multiprotocol Controllers Models 900 and 950

December 2, 1997
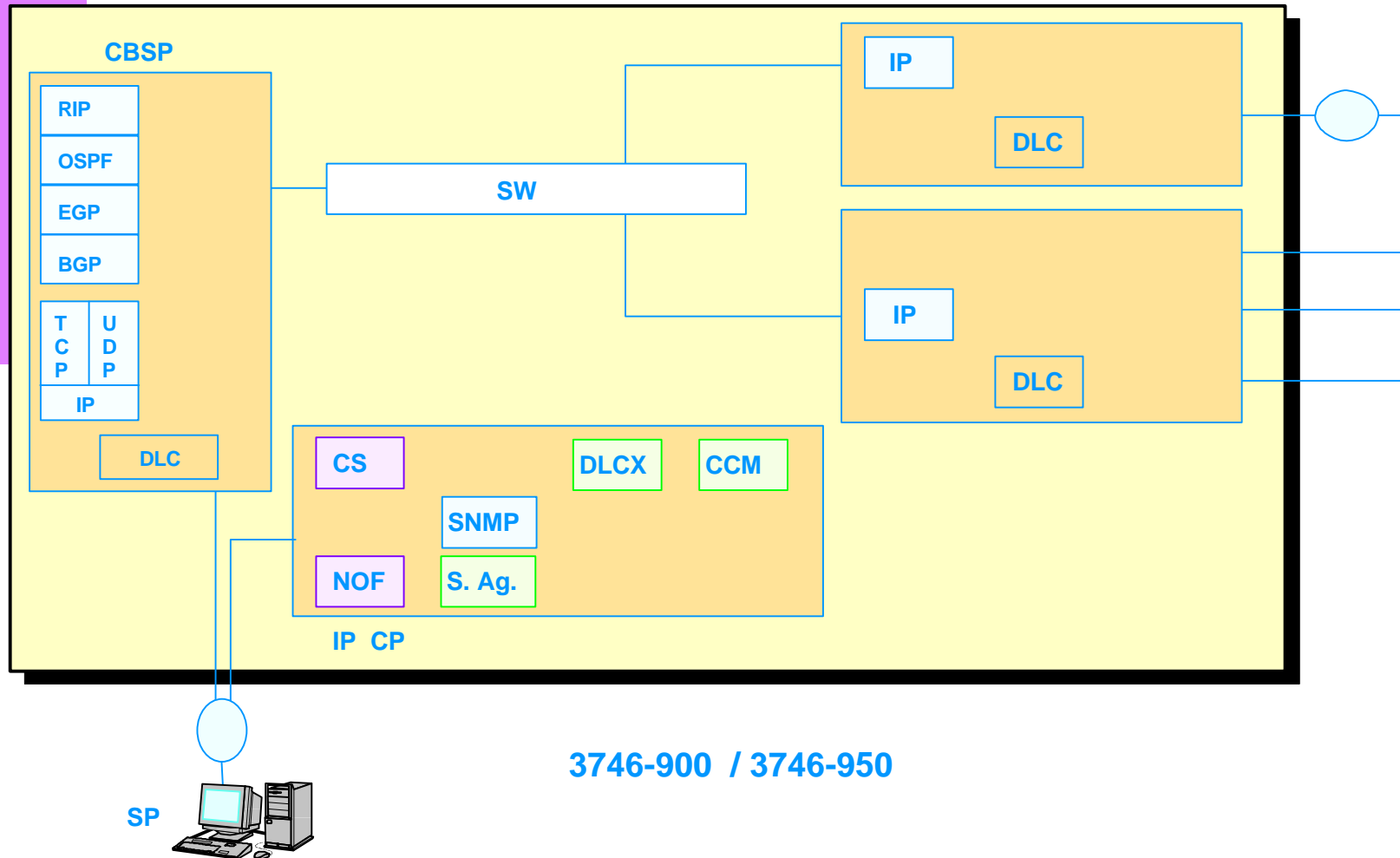**(Revision 4)**

IP Routing

IBM 3746 - Full Fledged IP Router

IBM

MVS WEB Server

TCP/IP

WEB Server

Native IP

Internet

ESCON

IP

WEB Server

RFC 1490

FR

Ethernet

PPP switched

(direction)

Token Ring

PPP leased

Intranet

- **Native IP routing over**
  - **LAN : Token-Ring, Ethernet**
  - **Channel: ESCON**
  - **WAN : Frame Relay, PPP (Leased Line)**
- **RIP (V1), OSPF (V2), BGP (V4), ARP**

- **Filtering, Access Control**
- **Multiple IP addresses per interface**
- **Header compression on WAN**
  - **RFC 1144**
- **Variable length subnet addresses**
- **IP application prioritization**
  - **Bandwidth Reservation System (BRS)**
- **Routing in the 3746 adapters**
- **Adapter sharing between IP/SNA/APPN/HPR**
- **SNMP support**
  - **Netview for AIX**

IBM 3746 - IP Components

IBM

CBSP

RIP

OSPF

EGP

BGP

| T C P | U D P |

IP

DLC

SW

IP

DLC

IP

DLC

CS

DLCX

CCM

SNMP

NOF

S. Ag.

IP CP

SP

3746-900 / 3746-950

IBM 3746 - Main IP Functions

- **Routing Protocols**
  - RIP (V1)
  - OSPF (V2)
  - BGP (V4)

- **ARP**
  - Basic ARP (T/R)
  - Proxy ARP
  - InARP for F/R
  - Config Aging Timer
  - Automatic refresh option

- **IP / ICMP**
  - Subnetting (w/variable length)
  - Multiple IP addresses per interface
  - Packet filter/Access Control
  - Source IP address
  - Destination ...
  - IP protocol number
  - TCP ...
  - UDP ...

- **ICMP**
  - Ping
  - Destination unreachable
  - Source redirect
  - Time exceeded
  - Parm problems
  - Address mask request/response

IBM 3746 - IP Filters

Routing table

9.0.0.0	255.0.0.0	Filter
9.100.0.0	255.255.0.0	Direct
9.150.0.0	255.255.0.0	9.200.1.1

IP datagram

Dest IP=9.150.2.2

IBM 3746

9.200.0.0

9.100.0.0

9.200.1.1

9.150.0.0

9.150.2.2
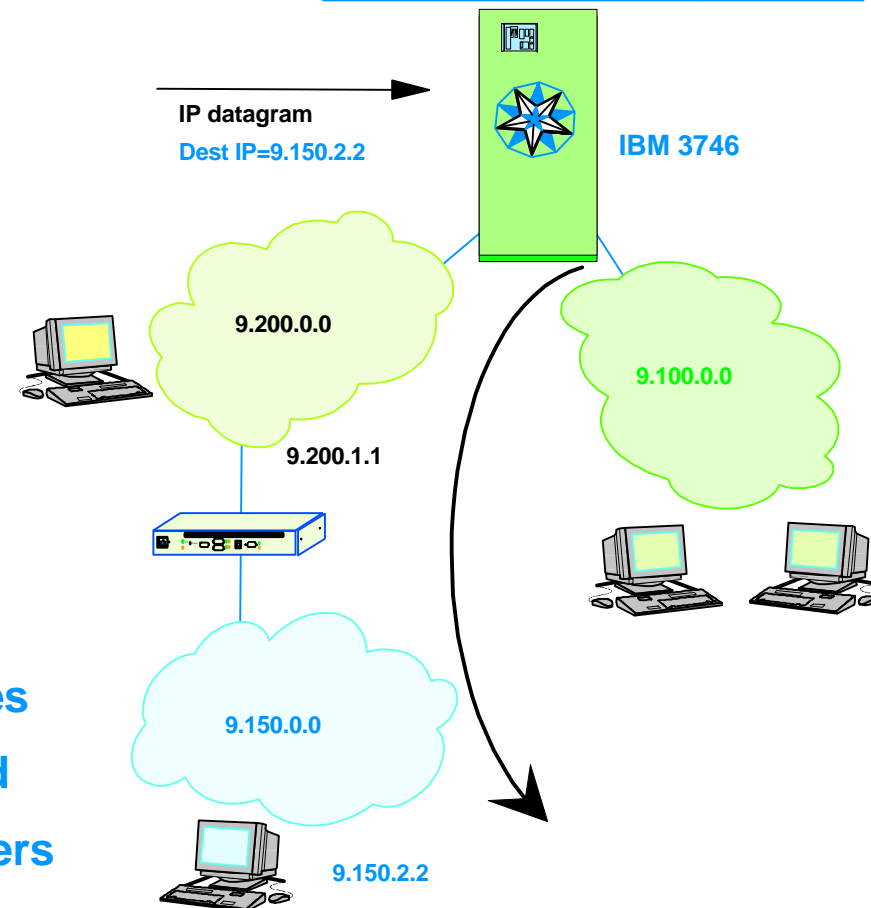
- **FILTERS**

  - **Defined as static routes**

  - **Consists of an IP add + mask**

  - **Saved in IP routing table & caches**

  - **Packets discarded if dest. add matches**

  - **Routes matching filters not advertised**

  - **OSPF routes takes precedence on filters**

  - **Can be overridden by a more specific route (best choice)**

IBM 3746 - IP Access Controls

- Inclusive 9.150.2.2
- Exclusive 9.150.0.0 / 255.255.0.0
- Exclusive 9.100.0.0 protocol number = 17 (UDP)

IBM 3746

Dest IP=9.150.2.3

Dest IP=9.100.1.1
UDP frames

Dest IP=9.150.2.2

9.200.0.0

9.100.0.0

9.200.1.1

9.150.2.1

9.150.0.0

9.150.2.3

9.150.2.2

- **ACCESS CONTROL**
  - **Specifically defined (not routes)**
  - **Inclusive or exclusive**
  - **IP source add (+ mask)**
  - **IP destination add (+ mask)**
  - **Range of protocol numbers**
  - **Range of port numbers**
  - **Based on ordered lists**
    - **first matching if multiple entries**
    - **less efficient than routing table**
  - **Cache of 8 most recently seen packets**
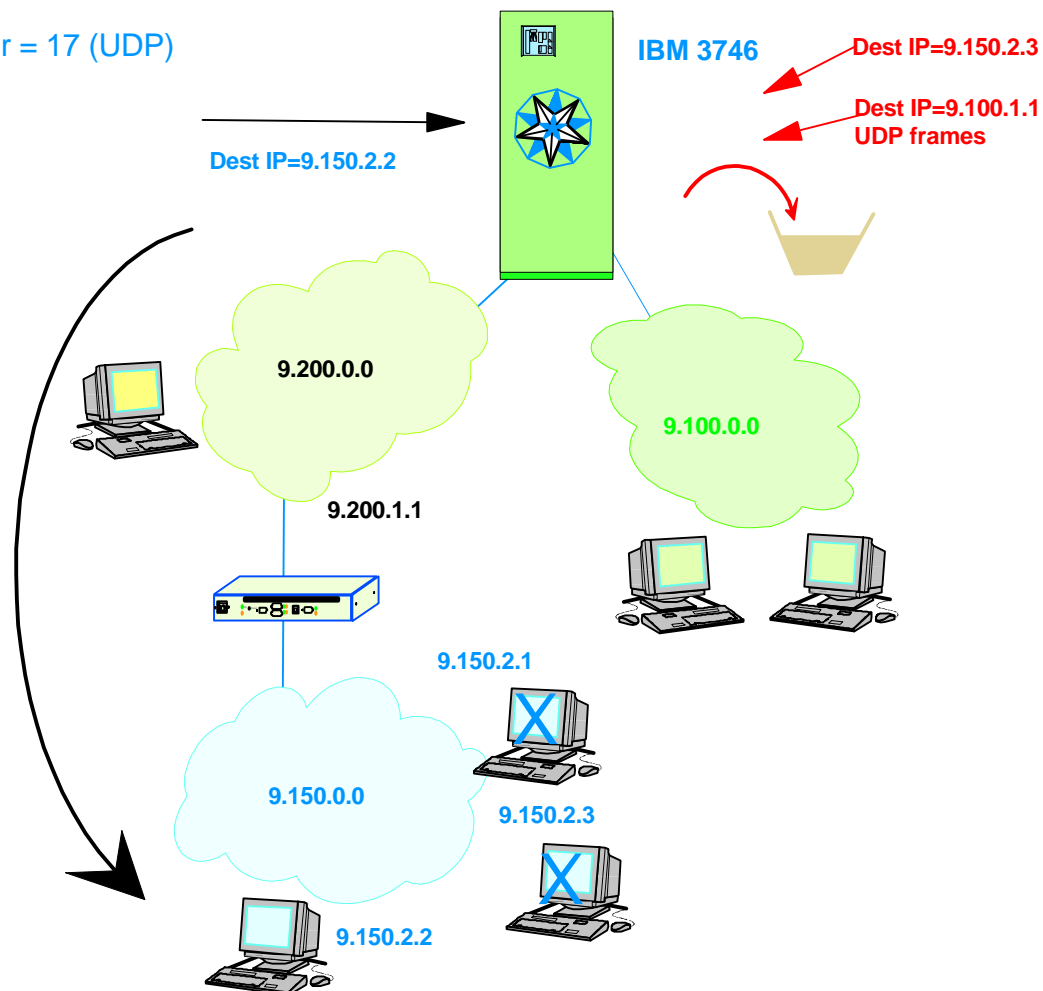
IBM 3746 - Adapter Sharing

IBM

- **ESCON**
  - **Physical line/Logical lines shared by NCP-A, NCP-B, APPN/HPR, IP**
  - **Stations (16 max) 1 per VTAM or TCP/IP MVS**

- **TRP**
  - **Physical line shared by NCP, APPN/HPR, IP**

- **CLP**
  - **SDLC line = not shared - NCP or APPN/HPR**
  - **PPP line = not shared - IP only**
  - **F/R line = shared by NCP, APPN/HPR, IP**
  - **F/R DLCI = NCP INN (BAN/INN) + APPN/HPR (BAN/Routed) + IP**
    or NCP BNN (BAN/Routed) + APPN/HPR (BAN/Routed) + IP