SNA Switching Services (SNASw) Technical Overview

Leveraging Investments, Empowering the Enterprise

CISCO SYSTEMS

Agenda

- **Status of Advanced Peer-to-Peer Networking (APPN) Networks Today**

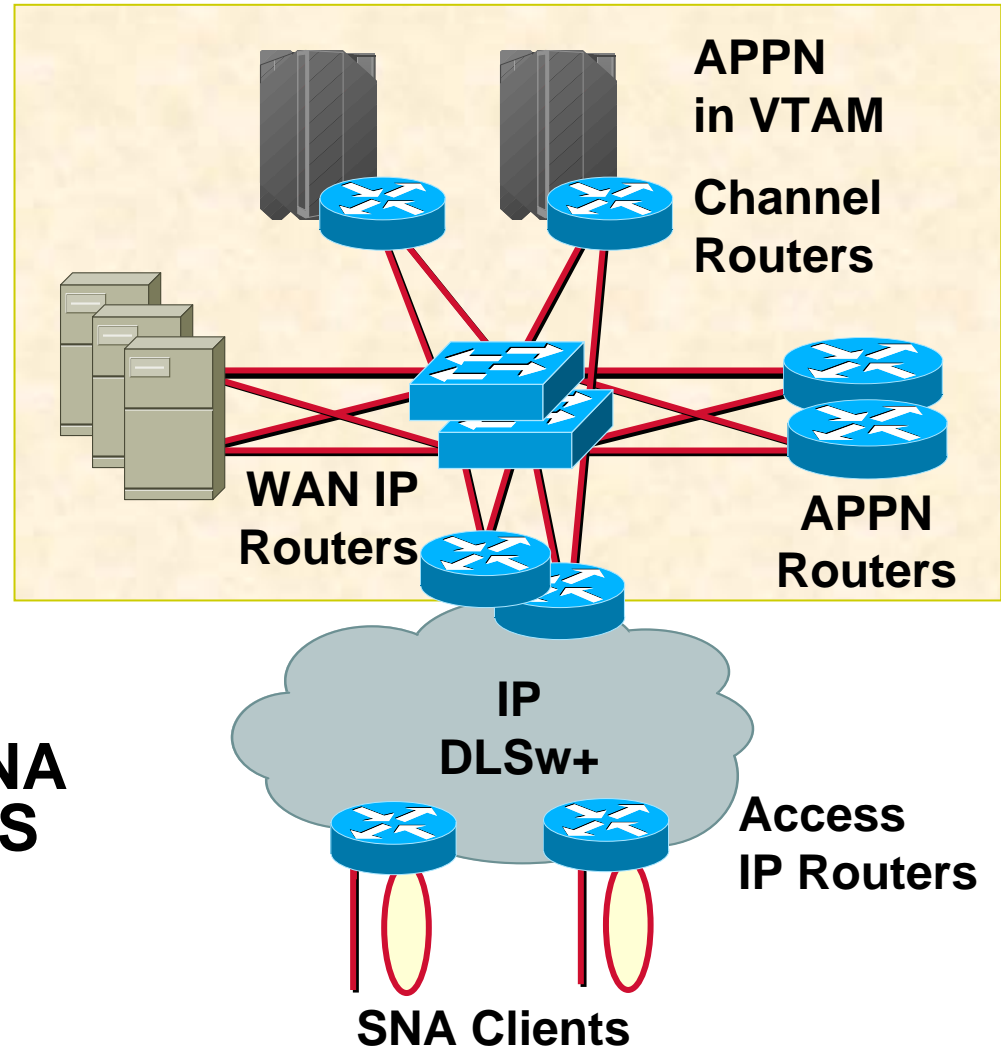- **Emerging Network Trends**

- **Cisco APPN Directions**

What Is APPN?

- **Second-generation SNA**

- **Support for decentralized networks**

- **Support for peer-to-peer applications and networking**

- **A "routable" protocol**

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APPN Features

- **Dynamic network topology**
- **Distributed directory services**
- **Native SNA routing**
- **Route selection using COS**
- **Concurrent subarea SNA support via DLUR/DLUS**

APPN in VTAM

Channel Routers

WAN IP Routers

APPN Routers

IP DLSw+

Access IP Routers

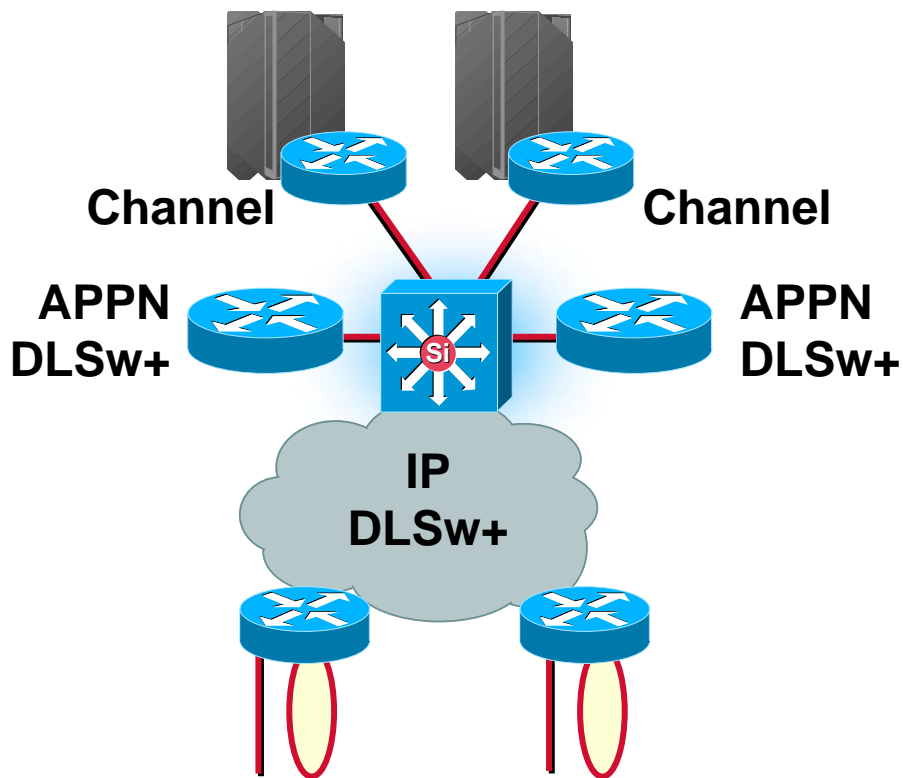**SNA Clients**

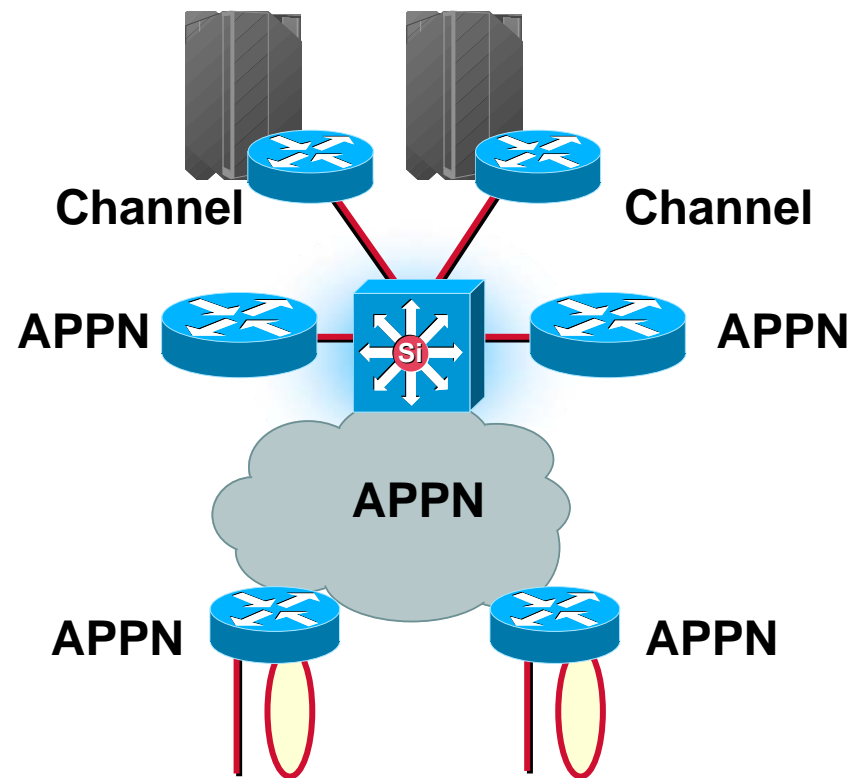www.cisco.com

Why Enterprises Choose APPN

- **Native SNA routing (95%)**

- **Reduced FEP dependency (90%)**

- **Support for sysplex environment (80%)**

- **Peer-to-peer communications (20%)**

- **Native SNA network (10%)**

Source: Cisco customers

What Do Cisco APPN Networks Look Like Today?

Channel   **Channel**

APPN DLSw+   **APPN DLSw+**

IP DLSw+

Channel   **Channel**

APPN   **APPN**

APPN

APPN   **APPN**

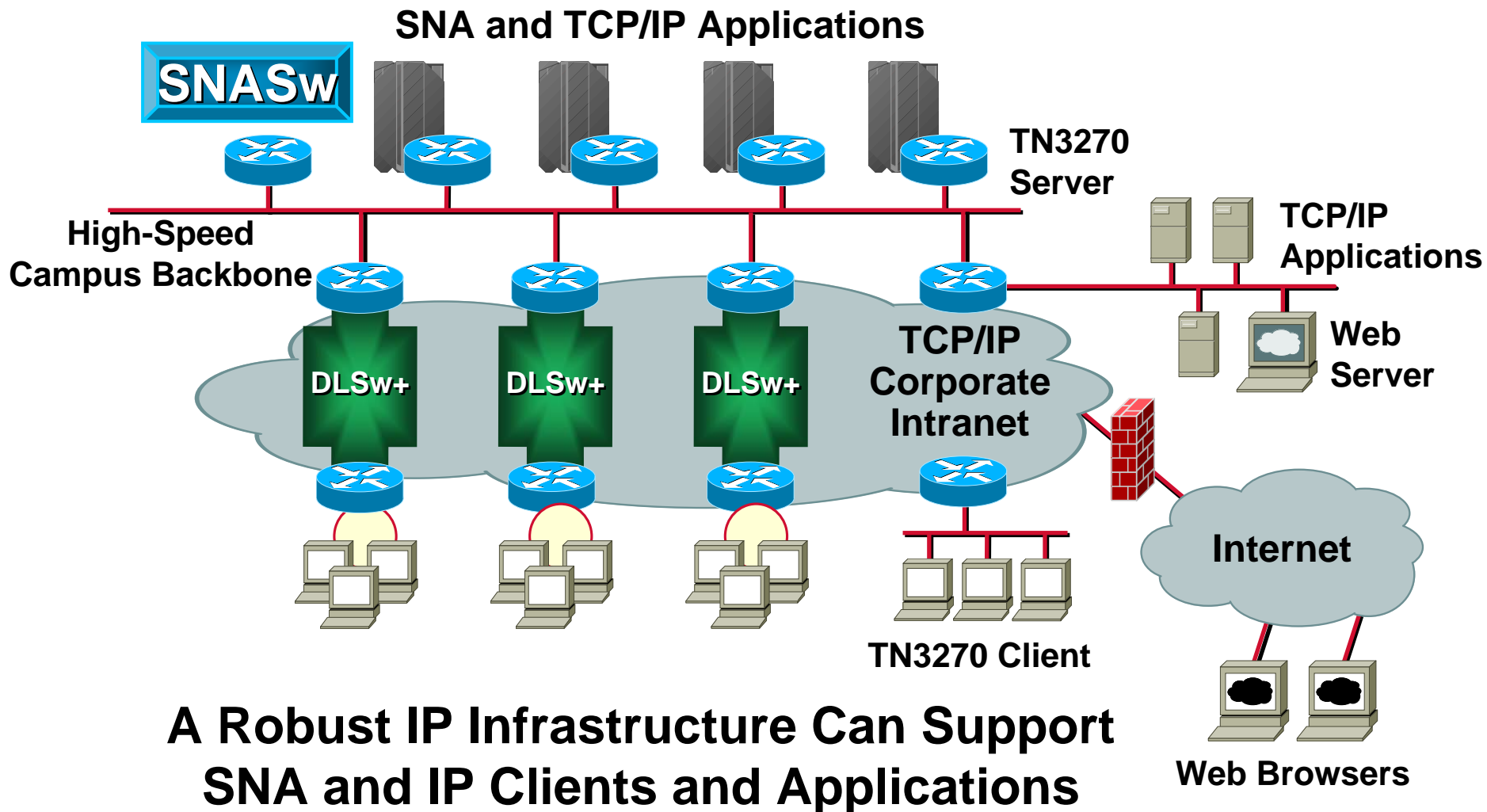- **90%—DLSw+ on backbone, APPN in data center**

- **10%—Native APPN across the backbone**

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Industry Trends Today

- **IP is becoming the default for the corporate intranet**

- **Non-SNA clients must access SNA applications**

- **Data centers must support SNA and IP applications**

- **Voice and video traffic will be consolidated with data traffic**

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Today's Consolidated Data Network

SNA and TCP/IP Applications

SNASw

TN3270 Server

High-Speed Campus Backbone

DLSw+ **DLSw+** **DLSw+**

TCP/IP Corporate Intranet

TCP/IP Applications

Web Server

Internet

TN3270 Client

Web Browsers

A Robust IP Infrastructure Can Support SNA and IP Clients and Applications

APPN Issues

- **Native APPN in the network is inconsistent with today's IP-based corporate intranet**

- **But… APPN is desired to route between multiple application hosts**

- **Native APPN networks are resource-intensive and have been difficult to scale**

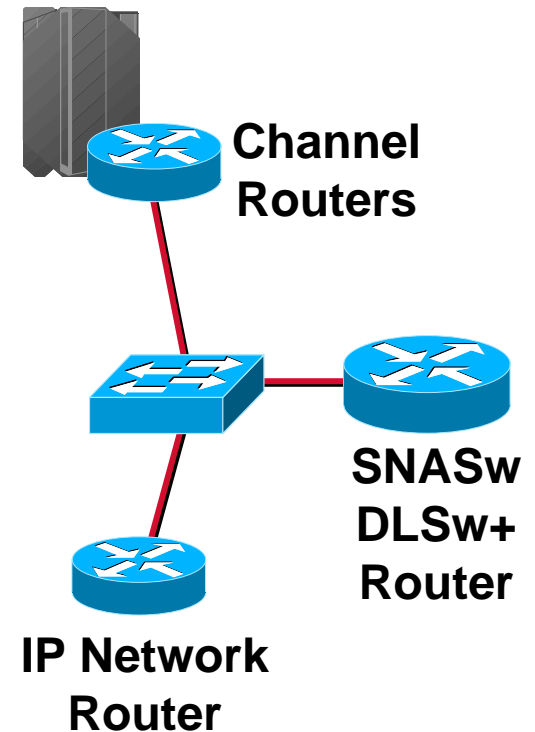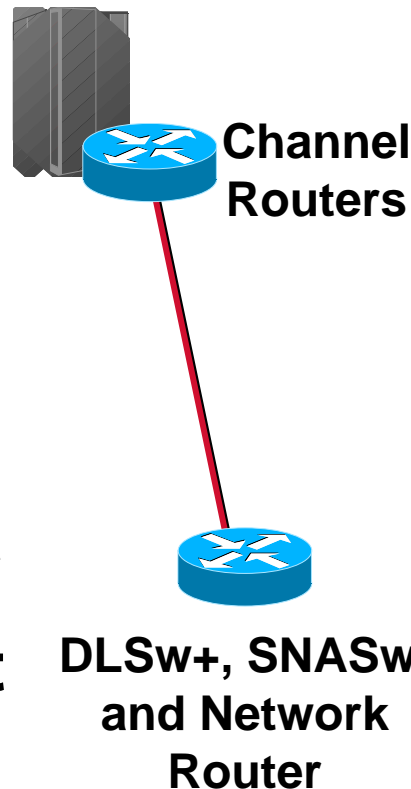- **APPN networks have been complex to design and configure**

Cisco APPN Goals

- **Integrate APPN into the IP infrastructure**

- **Provide efficient APPN functionality to route messages to the desired application host**

- **Improve APPN scalability by reducing the number of network nodes**

- **Reduce APPN complexity**

  Simplify network design

  Reduce configuration requirements

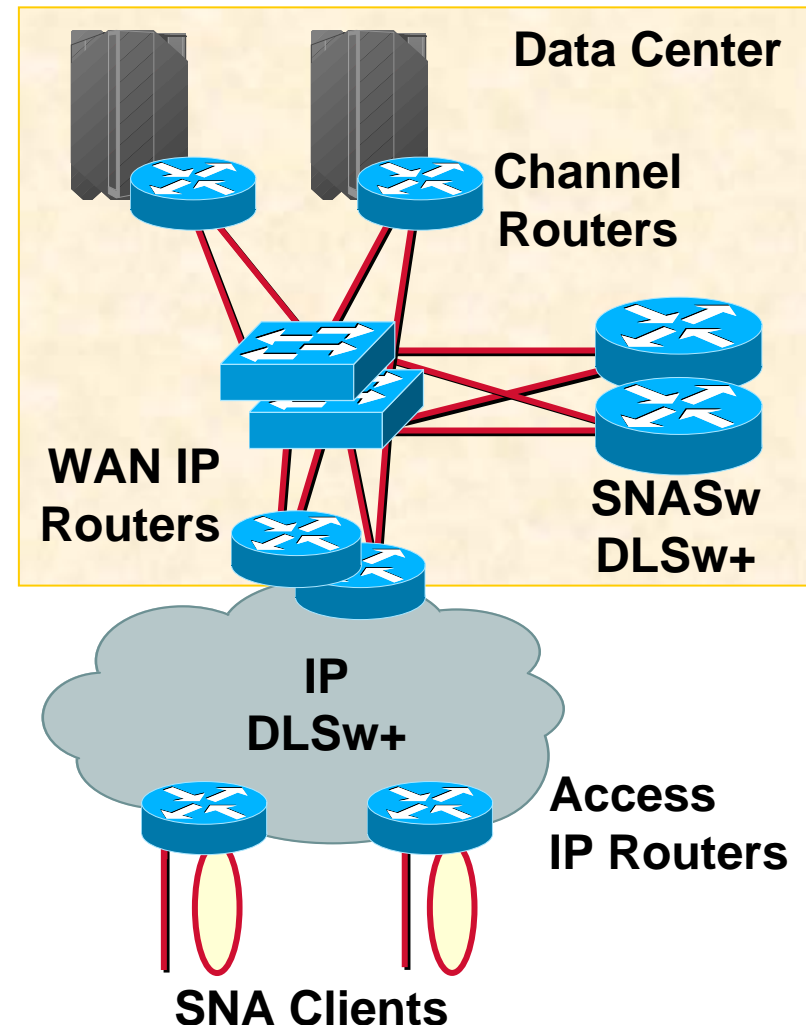www.cisco.com

Introducing:
SNA Switching Services

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First of All—1, 2, or 3 Routers in the Data Center?

Channel, DLSw+, SNASw, and Network Router

Channel Routers

Channel Routers

- **Fault domain**

- **Change management**

- **COSt of management**

- **COSt of hardware**

DLSw+, SNASw, and Network Router

IP Network Router

SNASw DLSw+ Router

What Are SNA Switching Services?

- **New release of APPN**

- **Branch Extender (BX) support to improve scalability**

- **Enterprise Extender (EX) support to integrate APPN into the IP network**

- **Full HPR support with updated ARB flow control**

- **Usability and management enhancements**

- **Reduced configuration requirements**

Data Center

Channel Routers

SNASw DLSw+

WAN IP Routers

IP DLSw+

Access IP Routers

SNA Clients

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SNASw Delivery

- **Cisco IOS® software release 12.0(5)XN/12.1**

  Currently scheduled for September/December, 1999

- **Platforms**

 **Cisco 2500, 2600, 36x0, 4x00, 7200, 7500, RSM**

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APPN NN versus SNASw BX

| Cisco APPN NN	SNASw BX
Full Routing Services	Works with VTAM To Provide Routing Services
HPR Network Support over IP: DLSw+	HPR Network Support over IP: DLSw+, EX
More than100 Configuration Commands and Operands	Approximately 30 Commands and Operands
Broadcast Traffic Grows as Number of Routers Increases	Broadcast Traffic Eliminated from Network

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What Is Branch Extender?

- **BX looks like an EN to upstream nodes**

- **BX looks like a NN to downstream nodes**
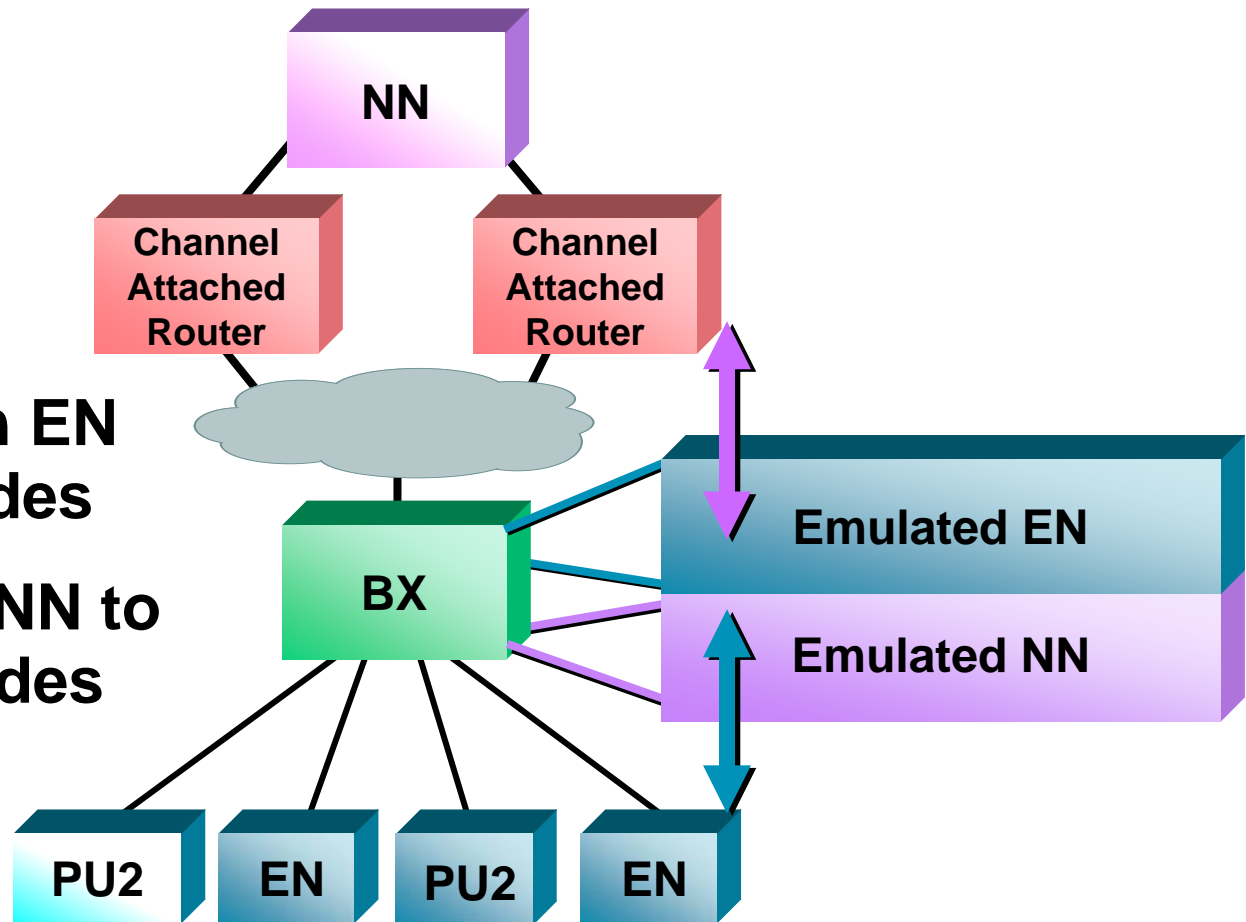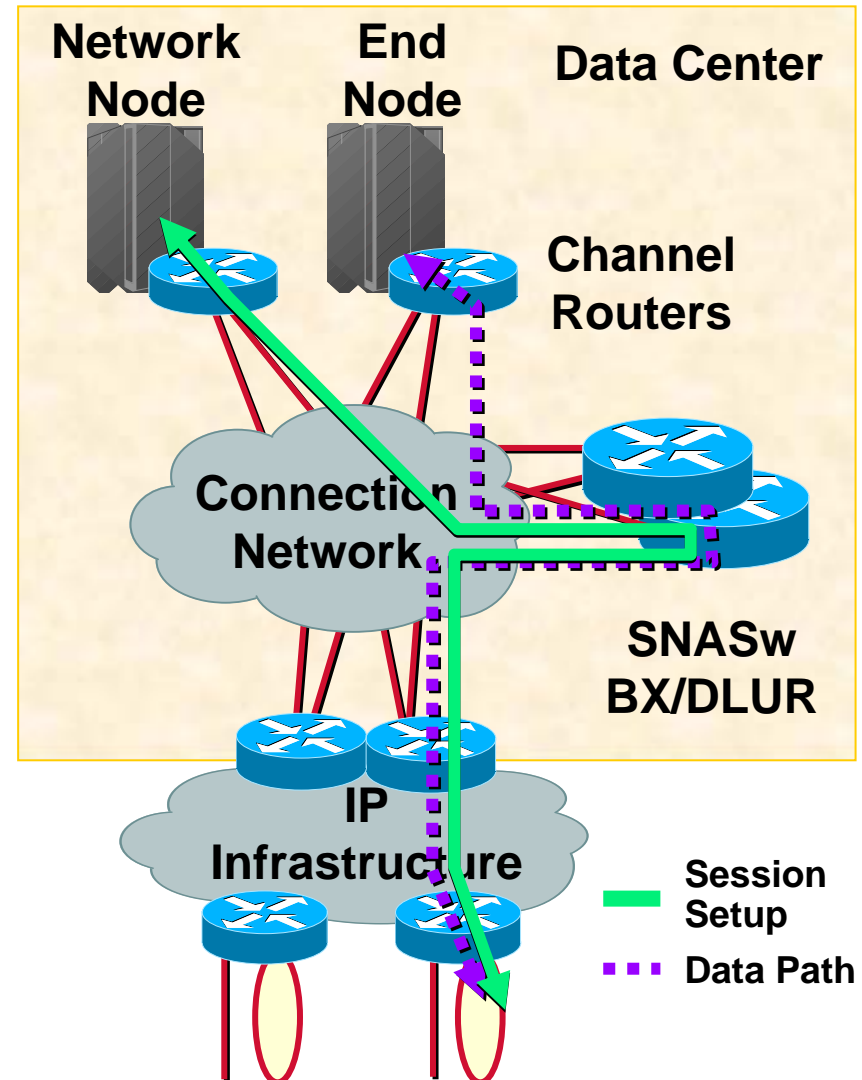
Branch Extender Network Design

- **Single (plus backup) VTAM NN with DLUS**

- **Other VTAMs ENs**

- **All Cisco data center routers SNASw with BX**

- **Channel-attached routers bridge**

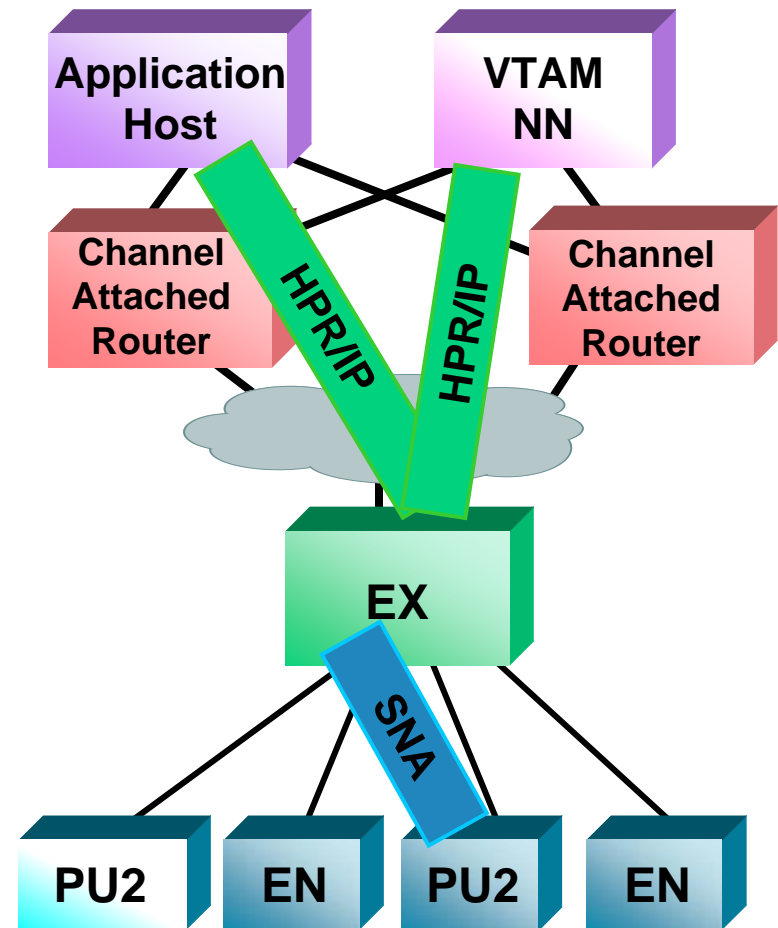- **SNASw nodes connect to VTAMs using connection network**

Network Node

End Node

Data Center

Channel Routers

Connection Network

SNASw BX/DLUR

IP Infrastructure
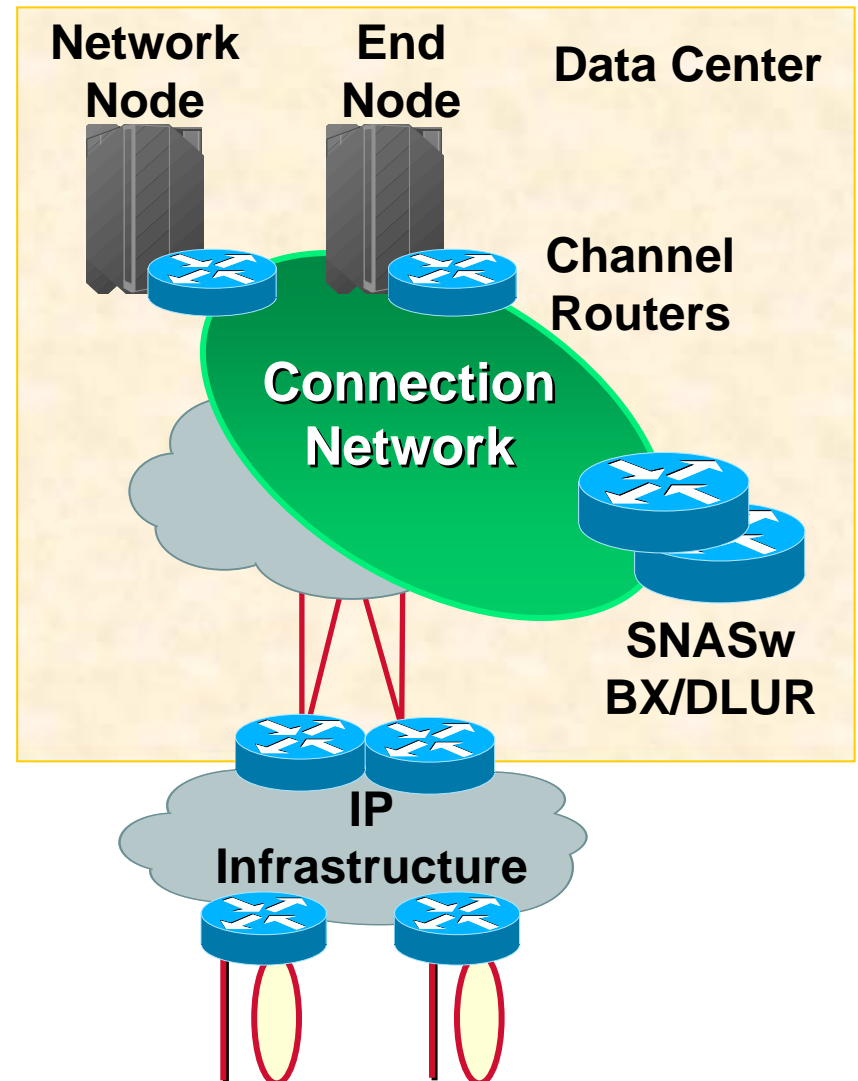
How Session Setup Works

- ## SNASw node

  - **Receives session setup request**

  - **Looks like an EN to VTAM**

  - **Passes session request to VTAM NN**

- ## VTAM selects path based on COS

- ## Application or SNASw node sends BIND to start session

- ## SNASw node routes traffic directly to correct application host

Network Node

End Node

Data Center

Channel Routers

Connection Network

SNASw BX/DLUR

IP Infrastructure

Session Setup

Data Path

What Is Enterprise Extender?

- **HPR/IP—RFC 2353**

- **Layer 3 IP routing**

  SNA nodes have IP addresses

  IP routing algorithm

- **Layer 4 HPR for reliability**

  HPR end-to-end flow control, error control, segmentation

  COS-IP precedence bits mapping

- **Implemented in OS/390 V2R6 with APAR OW36113**

  Parallel sysplex capable

Application Host

VTAM NN

Channel Attached Router

Channel Attached Router

HPR/IP

HPR/IP

EX

SNA

PU2 EN PU2 EN

Enterprise Extender Network Design

- **EX in VTAM and data center routers or remote routers**

- **Channel-attached router IP**

- **Remaining network routers IP**

- **Remote end user connected to EX network**
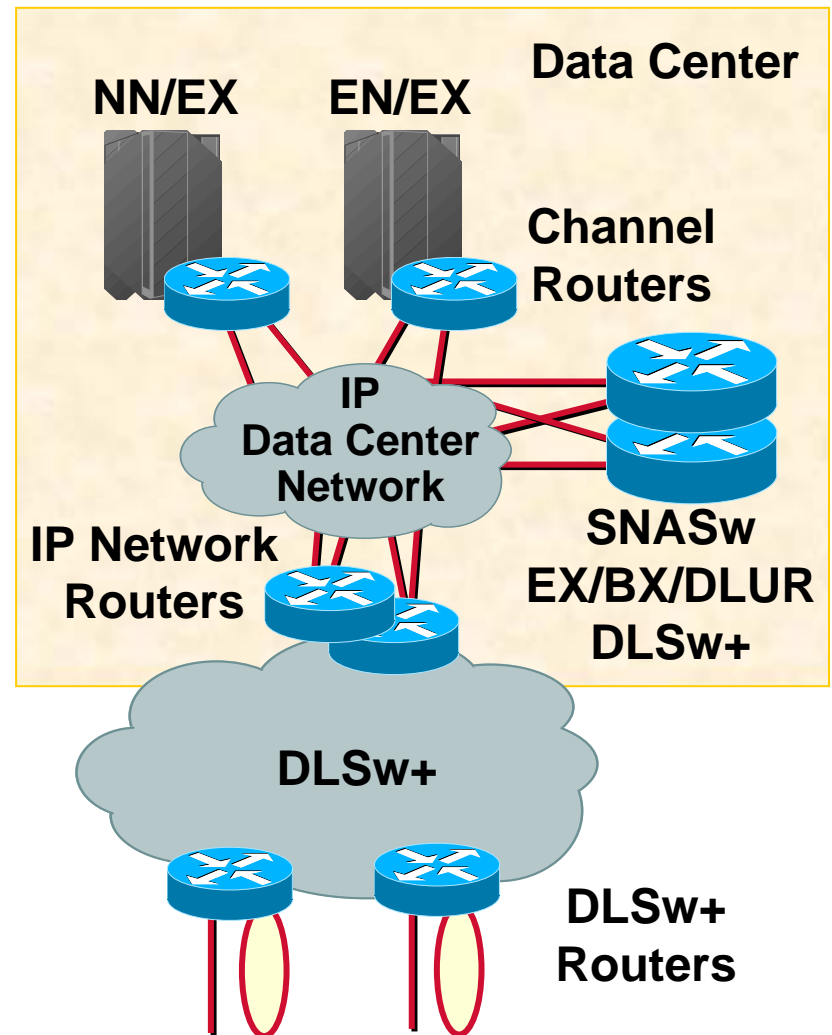
    DLSw+ across WAN to data center

    Native SNA to remote EX router

NN/EX   EN/EX   Data Center

Channel Routers

IP Data Center Network

SNASw EX/DLUR

IP Infrastructure
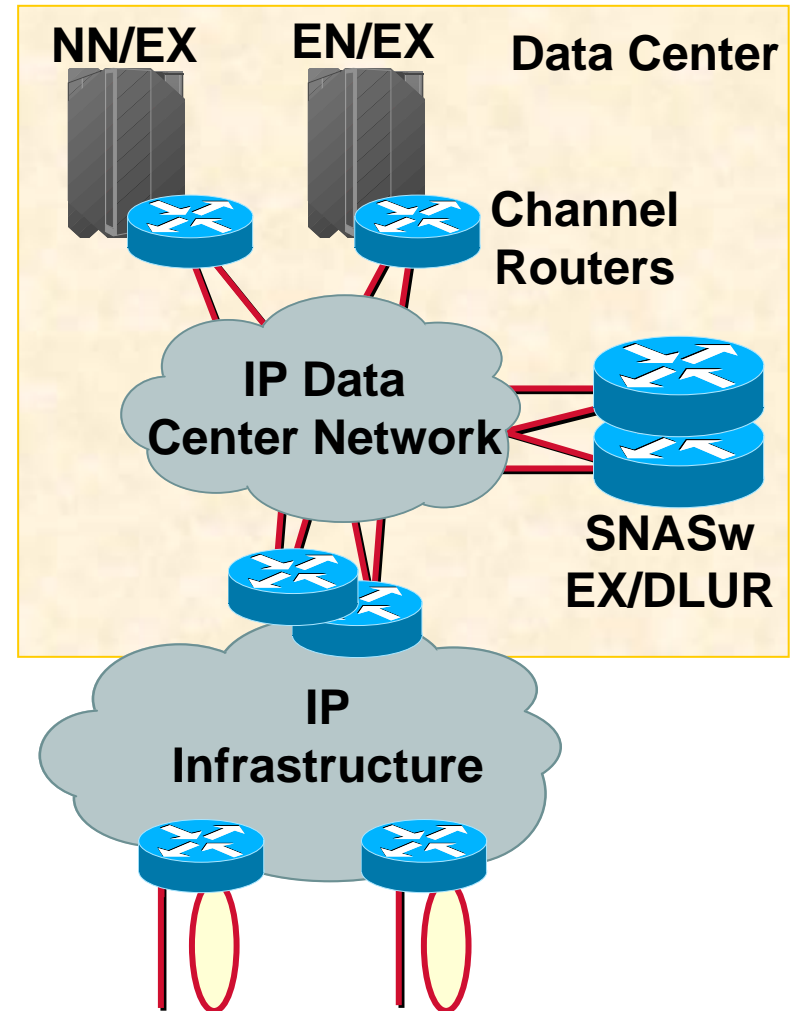
Enterprise Extender Model 1: DLSw+ to the Branch

- **No change to remote routers**

- **SNA ToS sets IP precedence bits**

- **DLSw+ proven technology**

- **Considerations**

  DLSw+ router point of failure

Data Center

NN/EX   EN/EX

Channel Routers

IP Data Center Network

IP Network Routers

SNASw EX/BX/DLUR DLSw+

DLSw+

DLSw+ Routers

Enterprise Extender Model 2: EX to the Branch

- **SNA COS sets IP precedence bits**
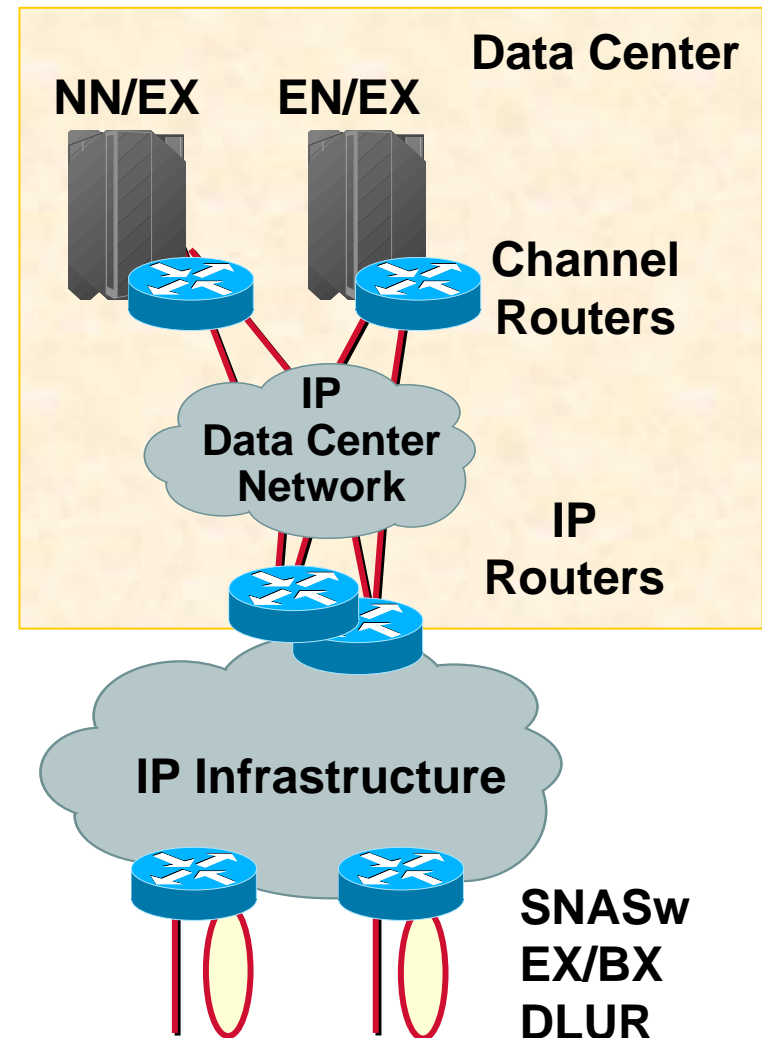
- **Considerations**

  - **Scalability not yet determined in large networks**

  - **Availability**

    - **Remote EX router point of failure or**

    - **EX to end station—VTAM recovery issues**

  - **Additional memory and processing in branch routers**

Data Center

NN/EX **EN/EX**

Channel Routers

IP Data Center Network

IP Routers

IP Infrastructure

SNASw EX/BX DLUR

Remote DLSw+ and EX Comparison

	DLSw+	EX
Message Priority	Sets IP Precedence Bits	Sets IP Precedence Bits
Availability Limitations	DLSw+ Router Point of Failure	VTAM Recovery for RTP Connections
Risks	Mature (500,000+ Routers)	New, Untested
Remote Routers	Minimal Memory, Minimal Processing Overhead	More Memory, More Processing Overhead

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SNASw Usability Enhancements

- **Dynamic CP name generation ***

- **Dynamic SNA BTU size ***

- **DLUR connect-out ***

- **New adaptive rate-based flow control algorithm**

- **User-settable port limits ***

* Unique Cisco feature

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SNASw Management Enhancements

Unique Cisco management features

- **APPN trap MIB support**

- **Sniffer-compatible traces**

- **Console message archiving**

- **Data-link tracing**

- **Interprocess signal tracing**

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Simplified Configuration

APPN NN

```
appn control-point NETA.R4700B01
dlus NETA.SJMVS3
dlur
complete
!
appn port SRB rsrb
rsrb-virtual-station 4000.5555.6666 54 1 53
complete
!
appn port TOK1 TokenRing1
complete
!
appn link-station SJMVS3
port SRB
lan-dest-address 4000.1234.0001
retry-limit infinite
complete
```

SNASw

```
snasw cpname NETA.R4700B01

snasw dlus NETA.SJMVS3

snasw port TOK1 TokenRing1
conntype nohpr

snasw port VTOK2 TokenRing2
conntype nohpr

snasw link SJMVS3 port VTOK2 rmac
4000.1234.0001
```

Managing APPN Resources with Maps and SNAView

- **From a Web browser, access:**

  SNA resources (PU and LU sessions)

  Topology and directory information

  Path information

  Hot links to other tools

  V 2.1 shipping 9/99

DLUR/DLUS

PU Name	PU State	DLUS Node Name	DLUR-DLUS State
CWBR01	Active	NETA.MVSD	Active
CWBR02	A		
CWBR03	A		
CWBR04	A		
CWBR05	A		
CWBR06	A		

CiscoWorks Blue
APPN Node Details — NETA.CWBC6CP

Home   APPN   Telnet   HTTP   Help

CiscoWorks Blue
Session Connectivity Display

Home   SNA View   Help

Session Connectivity

Mainframe		ISTPUS.MVSD Active
Major Node		SWDRTRS.MVSD Active
Host Connection		MAC/SAP: 4001.3745.1088/04
RIF		RIF: 1040.2.10.1.1010.1.2564
Router		cwb-c4 Active (DLSw)
		Active
DLSw-DLUR Router / Mainframe		Active cwb-c6 (NETA.CWBC6CP) Active (DLSw, A
		Active
Router		cwb-r01 Active (DLSw)
PU		CWBR01.MVSD CP: NETA.CWBCPR1 Activ

	Interface Type
0	Ethernet
55	Software Loopback
52	Frame Relay DTE

APPN Map Application

- **Logical view of APPN network**

- **Topology showing nodes, transmission groups, ports, links, PUs, DLUR-DLUS sessions, LUs, intermediate sessions**

- **Motif graphical display or Web tabular display**

- **Color-coding to represent status changes**

- **Requires the IBM-6611-APPN-MIB or standard APPN MIB (RFC 2455), DLUR MIB (RFC2232)**
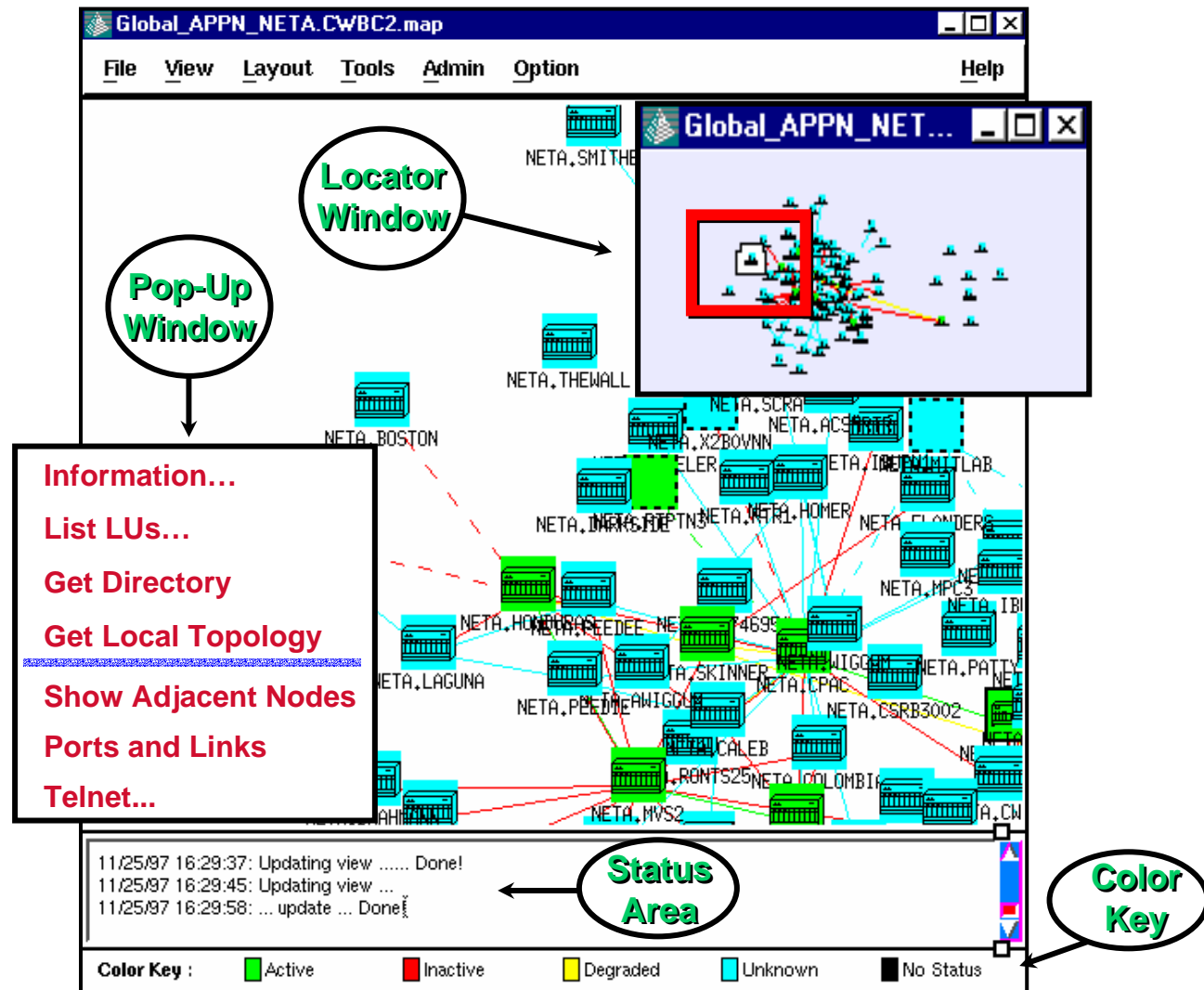
Display the APPN Global View

- **Global map displays:**

  Network nodes

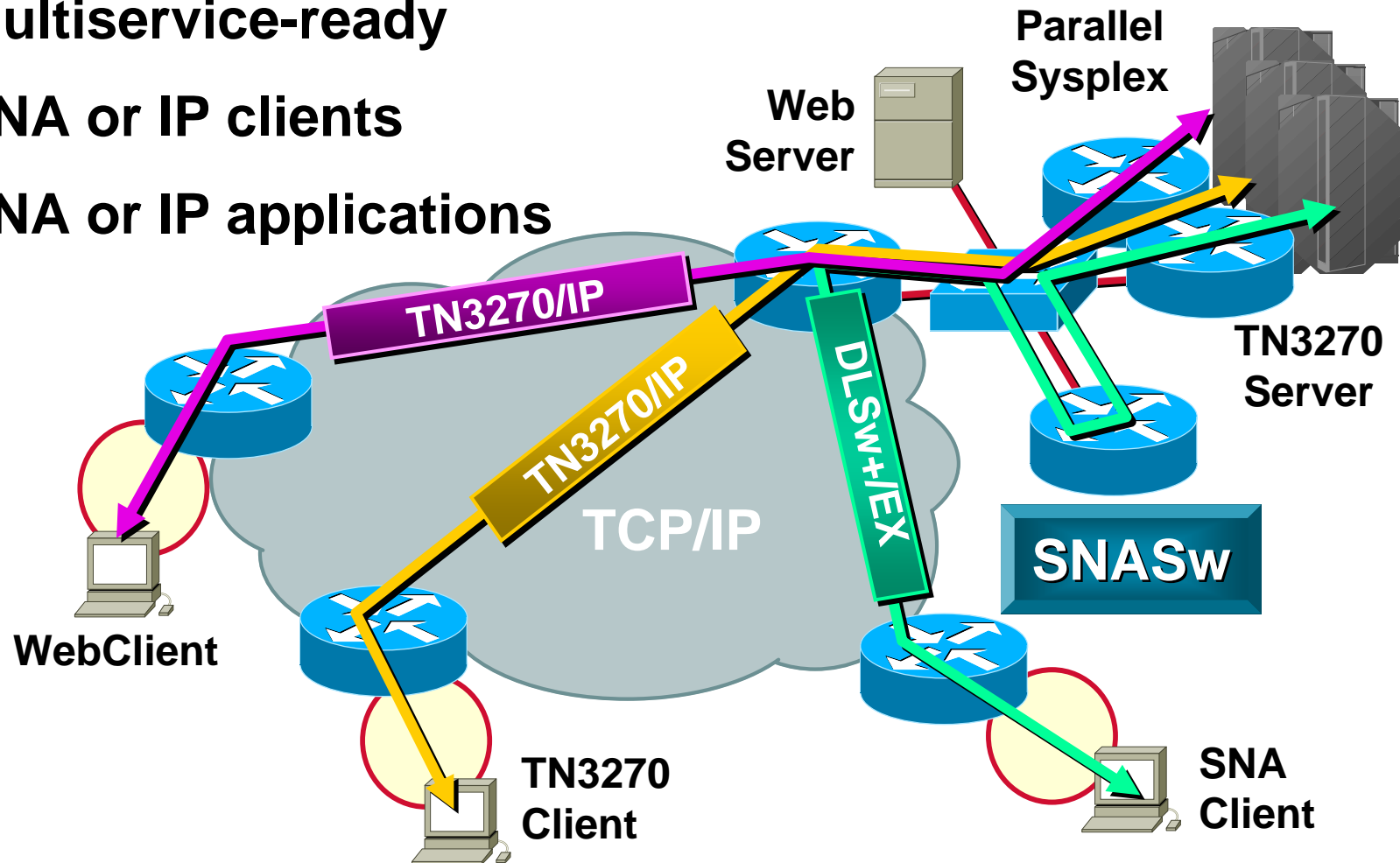 **BX nodes**

  Virtual routing nodes

  Connections between nodes

The Result:
An IP Infrastructure

- **Internet-ready, multiservice-ready**
- **SNA or IP clients**
- **SNA or IP applications**

Parallel Sysplex

Web Server

TN3270/IP

TN3270/IP

DLSw+/EX

TCP/IP

TN3270 Server

SNASw

WebClient

TN3270 Client

SNA Client

Summary

The SNASw solution from Cisco

- **Integrates SNA into the IP infrastructure**

- **Reduces complexity in APPN networks**

- **Provides a scalable solution**

- **Interfaces with all architecturally compliant APPN nodes**

- **Provides enhanced usability and management functionality**

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