High Performance Switching and Routing Solutions in an SNA/IP (EE) Network

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Room 102

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Abstract

- SNA over IP solutions have evolved over the last decade and half to provide a variety of solution options. The optimal solution depends upon the application environment and the evolution of legacy equipment in that environment. Typically, end users modernize their networks and then deploy technology that allows them to transport the SNA application traffic over the new IP network.
- Given that SNA networks have largely been replaced, this presentation focuses on replacing traditional 3270 terminals with emulation programs (TN3270) for SNA LU Type 2 applications and providing transport emulation (Enterprise Extender) that replace SNA infrastructure components to support SNA Advanced Peer-to-Peer Networking (APPN) applications (LU Type 6.2) and specialty devices (LU Type 0). The resulting solution leverages the advanced functionality and reliability of the latest switching and routing technology with these “tried-and-true” IBM software solutions for a simplified and effective SNA over IP solution.

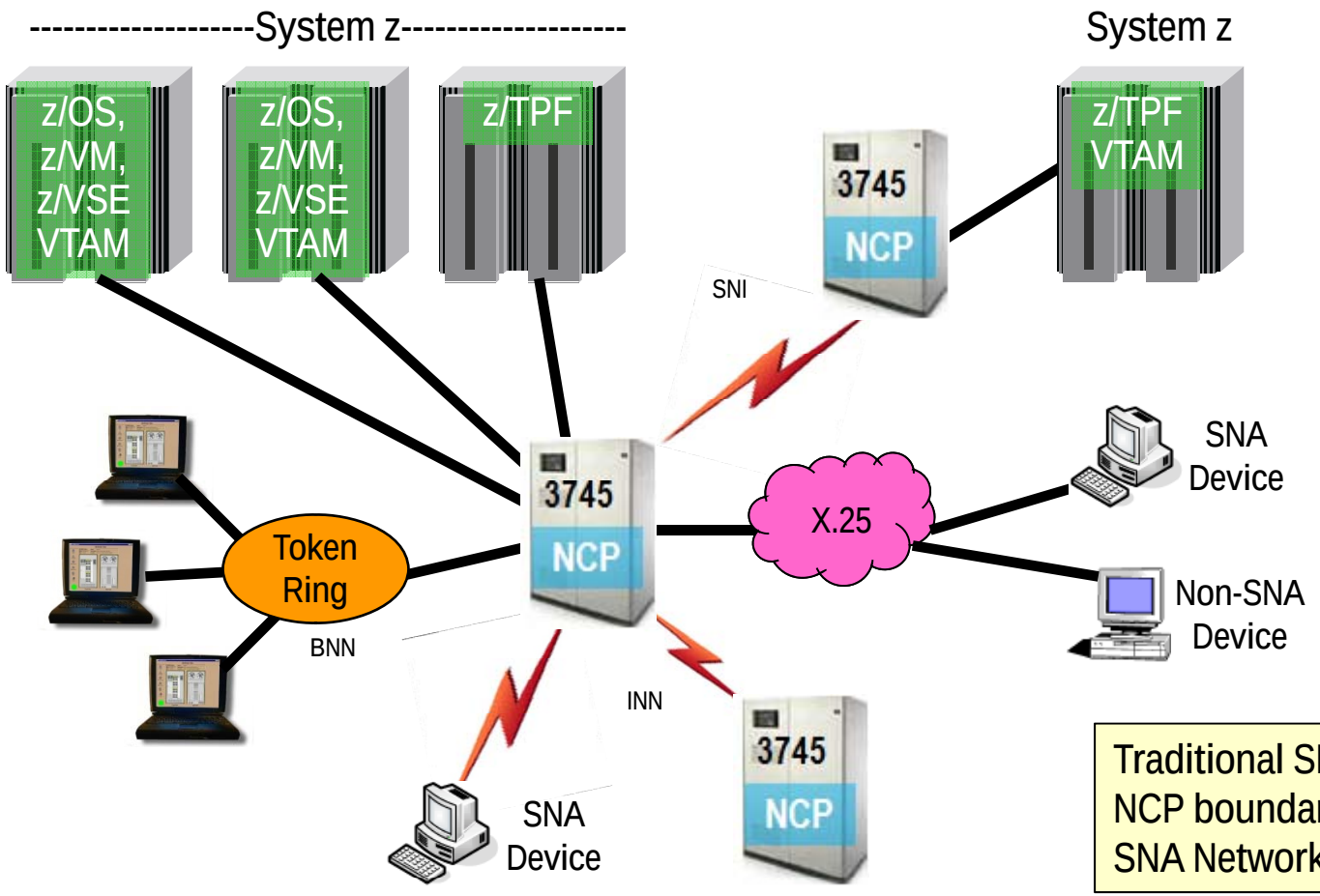
Agenda

- Mainframe as a TCP/IP server-online uses of mainframe
- SNA
- SNA/IP and Enterprise Extender
- Brocade product set
- Summary and recommendations

Mainframe has evolved as a TCP/ IP server

- Factors driving System z and zEnterprise towards IP routing:
  - 2010: mainframe is the dominant Online Transaction Processing[1] (OLTP) server platform
  - Old SNA applications transport mechanism is being replaced with IP transport – Enterprise Extender (EE)
  - Majority of new applications being developed are IP based
  - These new applications require QoS that IP provides
  - Data replication-has high performance requirements
  - Load balancing between sysplexes
  - TN3270 application requirements for IP to/from the mainframe

Traditional SNA Networks



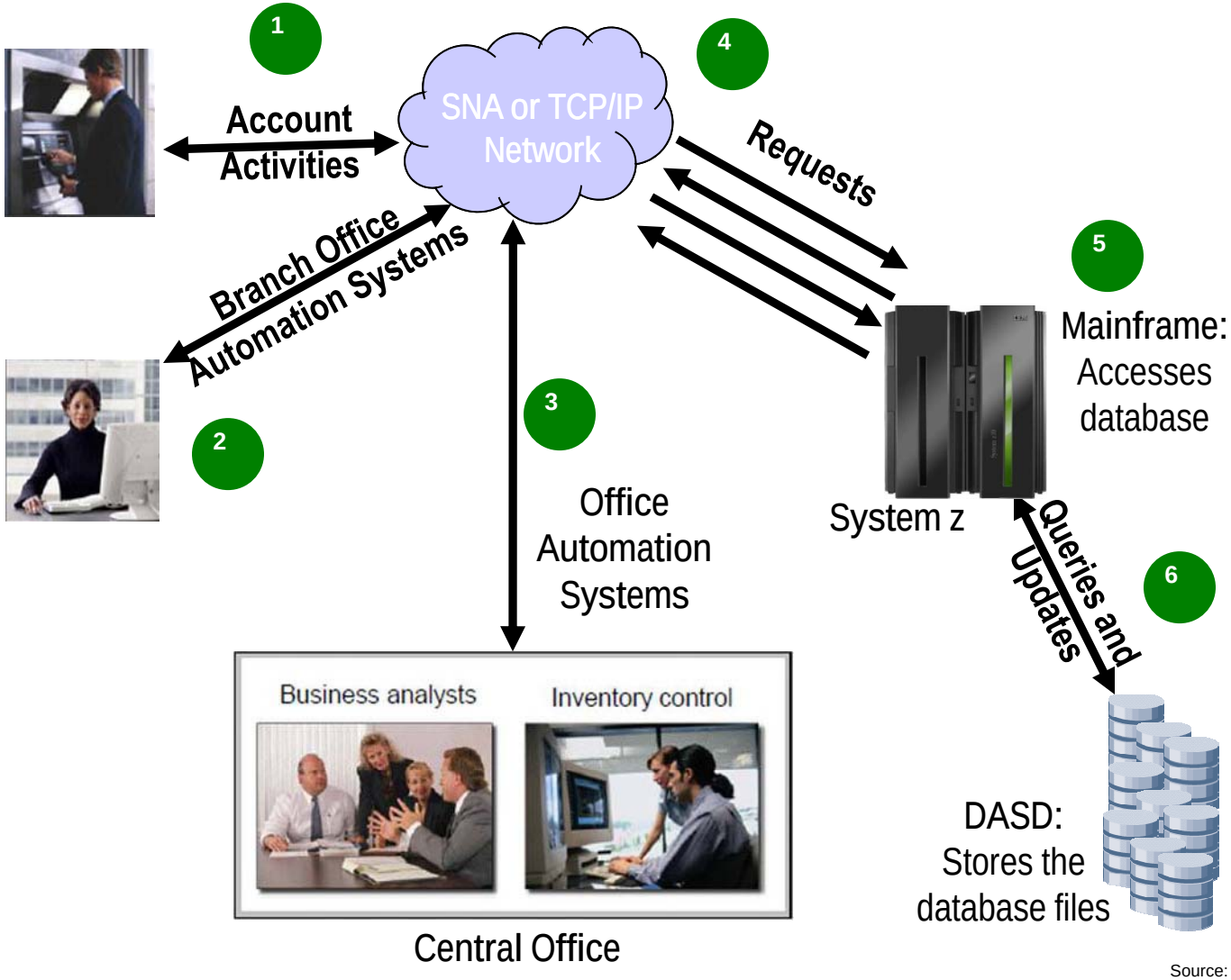
Traditional SNA subarea (INN)
NCP boundary (BNN)
SNA Network Interconnect (SNI)

- 3745 is approaching End-of-Life

Examples of industry use of mainframe based online systems include

- Banks-ATMs, teller systems for customer service and online financial systems.
- Insurance-Agent systems for policy management and claims processing.
- Government-tax processing, license issuance and management.
- Travel and transport-airline and hotel reservation systems
- Manufacturing-Inventory control, production, and scheduling.
- Retail-supermarket payments with debit or credit cards, point of sale terminals, buying merchandise over the internet.

Typical online use of mainframes for SNA



Source: Introduction To the New Mainframe: z/OS Basics. IBM Redbooks

Systems Network Architecture (SNA)

- IBM introduced SNA in 1974
- In the 1980s, SNA was widely implemented by large (Fortune 1000) corporations because it allowed their IT organizations to extend central computing capability worldwide with reasonable response times and reliability.
- 2010: Organizations still have a heavy investment in SNA based transaction programs and applications on the mainframe
  - According to IBM, as of 2009 over $ twenty trillion have been invested in SNA applications in over 40,000 organizations worldwide.
  - Over 1 trillion lines of customer written application code based on CICS, IMS and DB2
  - IBM surveys indicated that SNA accounts for 61% of wide area network traffic, and 66% of WAN budgets

Quotable

- “This report of my death was an exaggeration”

  – Mark Twain, 1897

  – SNA, 2010

Factors contributing to the continued use of SNA

- SNA is stable, trusted and relied upon for mission-critical business applications worldwide.
- 70% of the world's corporate data is still handled on the mainframe and a lot of that data happens to be utilized by SNA applications
- SNA is connection-oriented with many timers and control mechanisms that ensure reliable delivery of data.
- Rewriting stable, well tuned business applications, to change from SNA program interfaces to TCP/IP sockets, can be costly and time consuming.
- Many businesses are choosing to use Web-enabling technologies to make the vast amount of centralized data available to the TCP/IP based Web environment while maintaining SNA APIs.
  - This ensures that SNA will be around well into the future as SNA/IP

How do we get to SNA/IP?

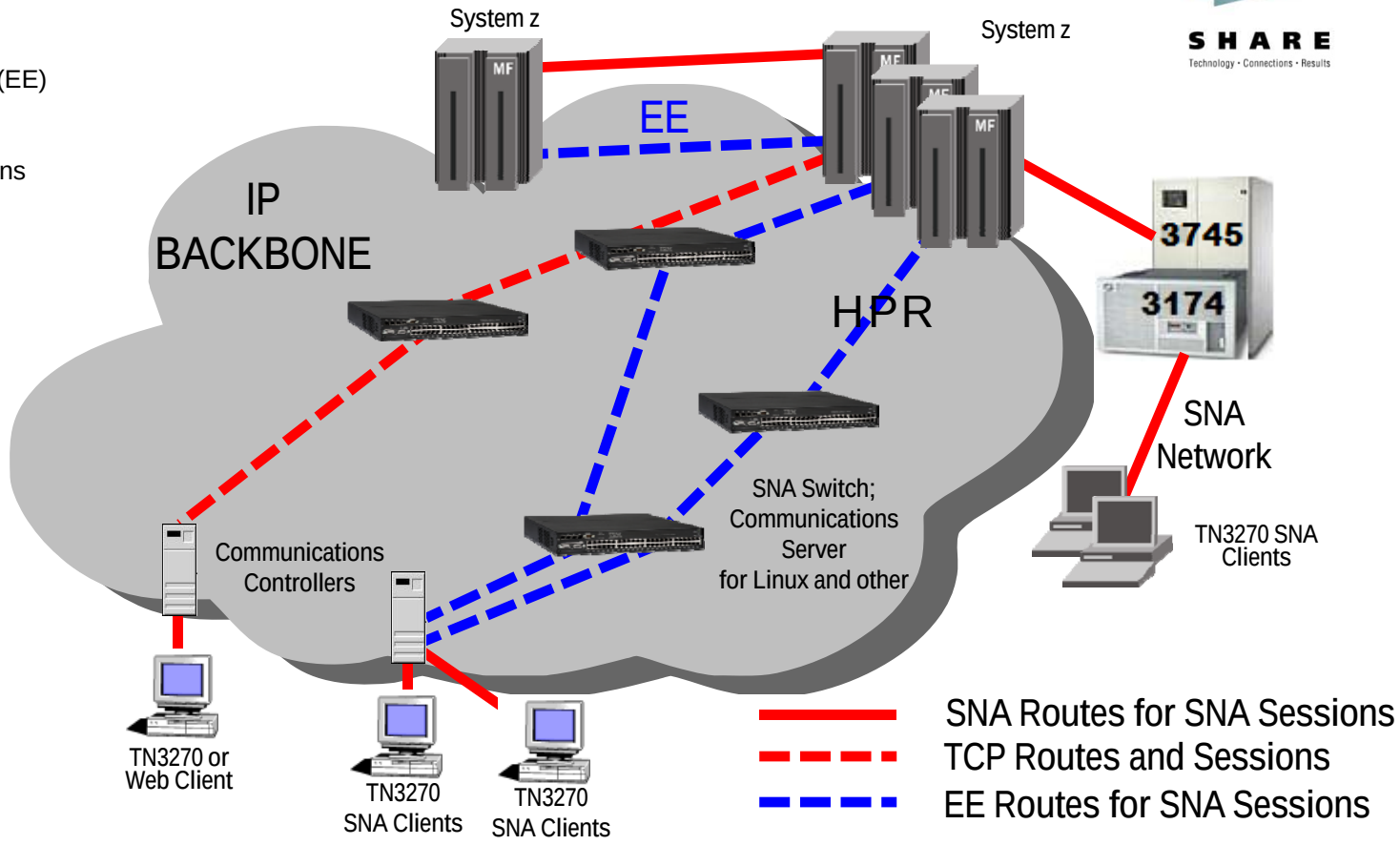
- A transaction oriented program is dependent on the underlying protocol it uses. The API is different if one uses SNA or TCP/IP as the transport in the network…AND…changing a transaction oriented program from one protocol to another protocol requires a re-design of the communication part in the program.
  - Replacing the code that handles error recovery, exception processing, and many other tasks
- This conversion of existing SNA applications to TCP/IP-enabled applications can be economically impractical
- So, how can we enable IP applications and preserve SNA-application and endpoint investment, while converging on a single network protocol?

Commonly used SNA over IP integration technologies

- There are several different ways of running SNA and TCP/IP mixed protocol communication over single IP protocol transport networks.
- The following System z Communications Server solutions are commonplace at organizations:
  - Data link switching (DLSw). SNA traffic is encapsulated in TCP packets.
  - Telnet/3270 (TN3270). 3270 data streams are carried over TCP connections to a server that replaces the TCP transport with SNA transport
  - ***Enterprise Extender*****:** SNA High Performance Routing (HPR) packets are carried as User Datagram Protocol (UDP) packets over an IP network

Mainframe as an IP server

Enterprise Extender (EE) allows the use of IP to replace Native-SNA sessions



- EE allows enablement of IP applications and convergence on a single network transport while preserving SNA application and end-point investment
- Typically isolates SNA footprints to the “outside” of the network

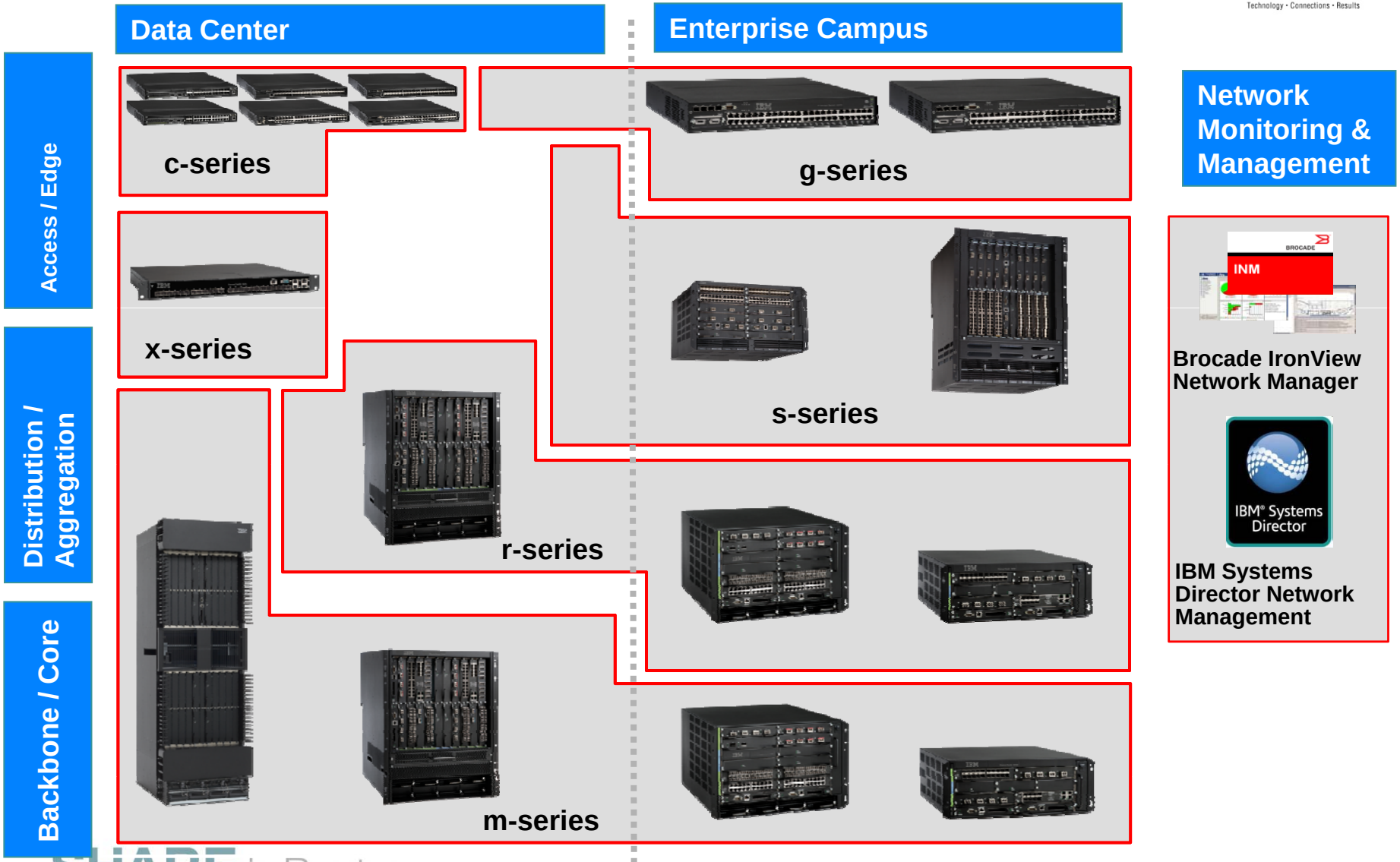
IBM Enterprise Extender - advantages

- Allows use of IP network for SNA sessions
- Enablement of IP applications and convergence on a single network transport while preserving SNA application and endpoint investment.
  - Eliminates parallel networks, reduces equipment, lowers data circuit cost, simplifies network management.
- No Changes required to SNA applications.
- SNA can exploit the OSA gigabit/10 gigabit Ethernet interface cards.

System z OSA channel cards

- Open Systems Adapter (OSA) provides the integrated hardware features installed in a System z I/O cage for networking connectivity.
  - Look at these as the NIC for a mainframe
- Older OSA-Express2 provides connectivity to Local Area Networks (LANs), supports 1000BASE-T Ethernet, Gigabit Ethernet (GbE) LX and SX, and 10 GbE LR
- Latest and greatest: OSA Express 3
  - GbE, 10 GbE and 1000Base-T Ethernet
  - High performance with standard and jumbo frames
  - 2 channels (ports) per channel card
    - 48 ports per System z10 and System z9
  - QDIO mode
  - Layer 3 and layer 2 transport

Brocade IP Portfolio



Review SNA over IP Concepts

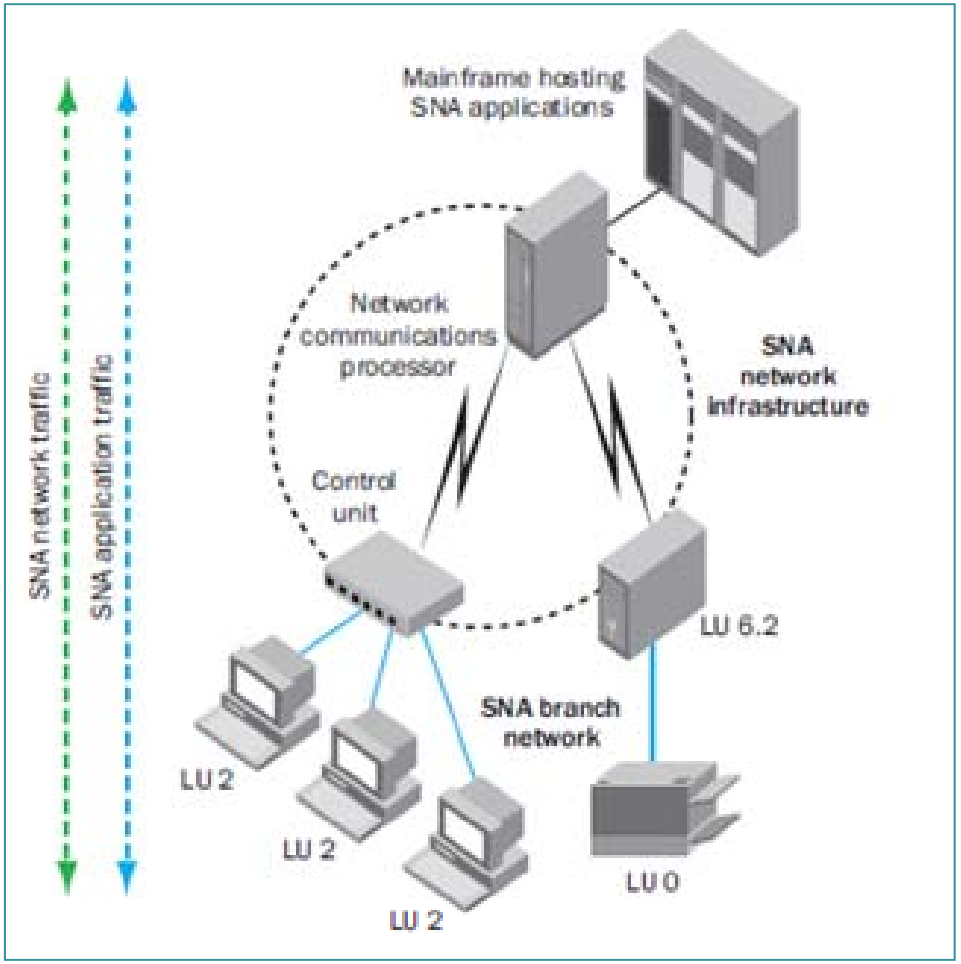
- Brocade Mainframe White Paper
  - “Brocade Solutions for Deploying Systems Network Architecture (SNA) in IP-Based Environments”
- Review the basics of SNAoIP
- Examine two common deployments
  - TN3270
  - Enterprise Extender

Components of an SNA Network

- The mainframe hosting the applications and acting as the System Services Control Point (SSCP)
- The communications controller hosting the Network Control Program (NCP)
- The leased or dial-up lines connecting the data center to the remote locations
- The terminal control units connecting terminals and printer or branch computers hosting applications and/or connecting terminals and printers

Traditional SNA Network

- Local Device Connectivity
  - Attached to Control Unit
    - Provides device intelligence and SNA network connectivity
  - Intelligent devices connect directly to SNA network
- Host Connectivity
  - Provided by Network Communications processor (3745)
  - Mainframe connects directly to communications processor

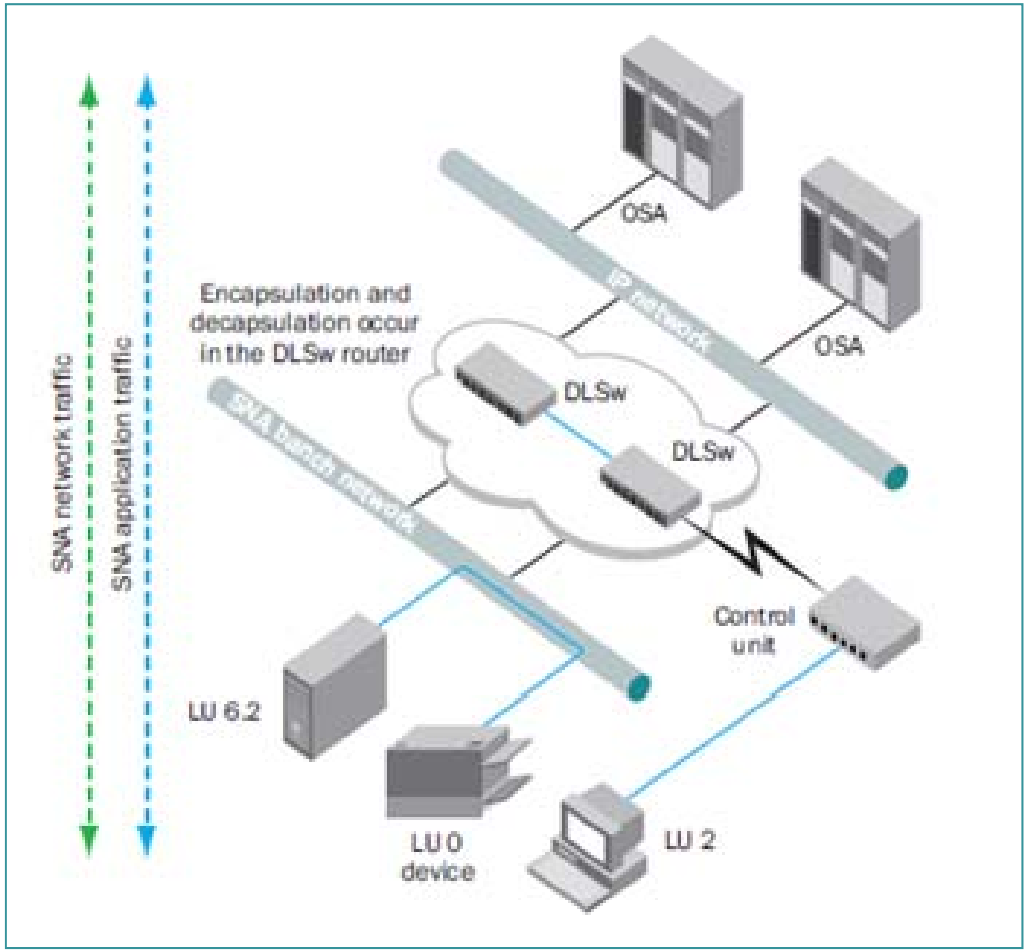


Components of an SNA over IP Network

- The mainframe hosting the applications and acting as the System Services Control Point (SSCP)
- The communications controller hosting the Network Control Program (NCP)
- The Ethernet IP network connecting the data center to the remote locations
- The SNA over IP adapter encapsulating the SNA protocol for transport over the Ethernet IP network and for connecting to the terminal control units
- The terminal control units connecting terminals and printer or branch computers hosting applications and/or connecting terminals and printers

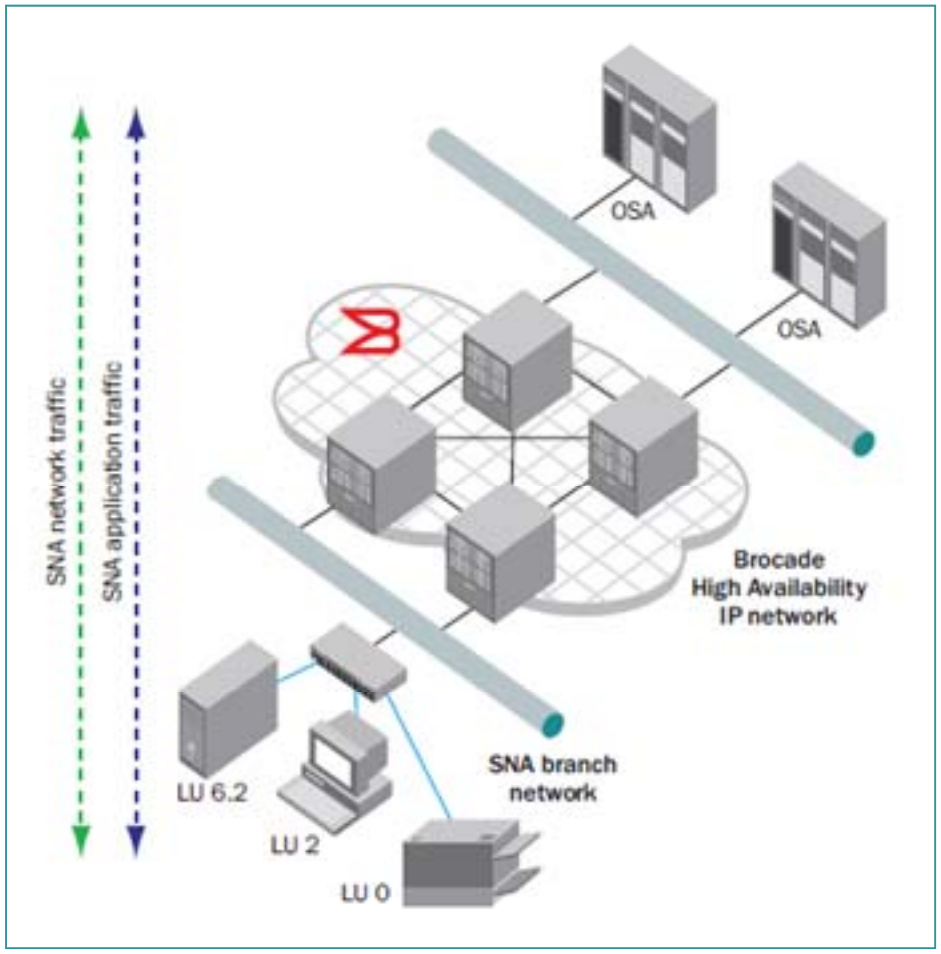
Basic SNA Over IP Network

- Branch Devices
  - LU6.2
  - LU2
  - LU0
- Device Connectivity
  - Connected through DLSw capable IP switch
- Host Connectivity
  - Connected over IP network through DLSw capable IP switch
- SNA traffic is encapsulated by DLSw to flow over IP network



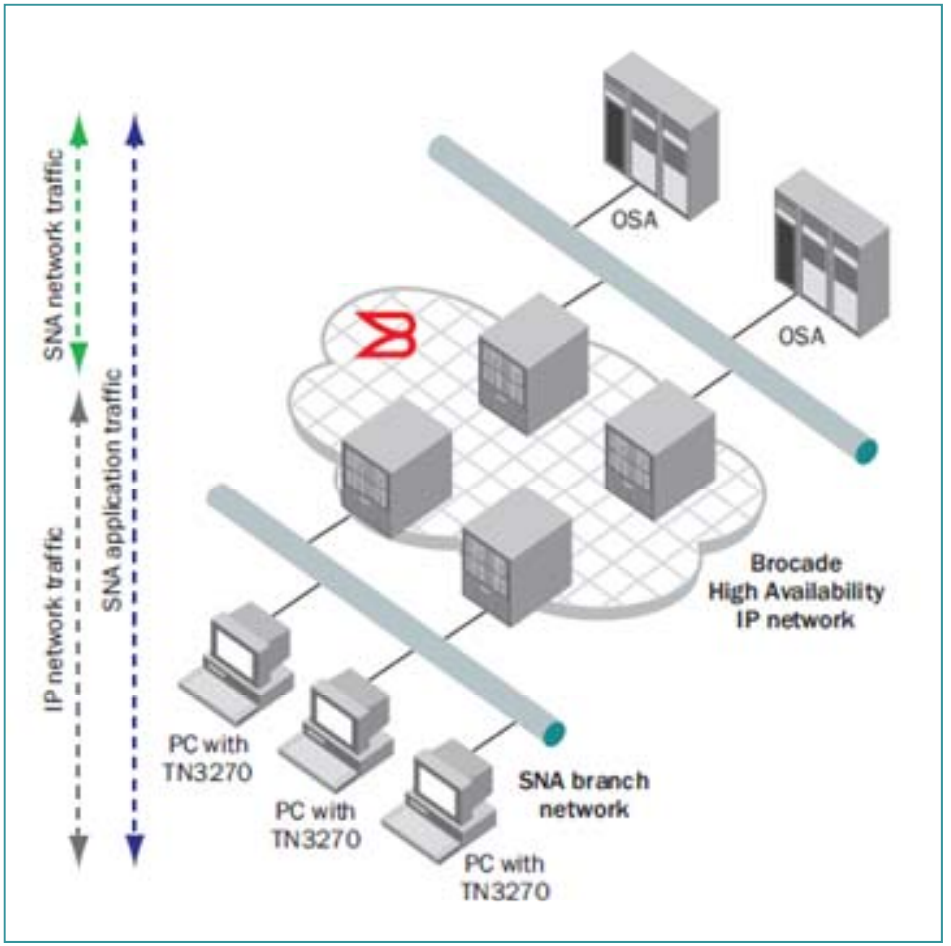
Modern Deployment of SNAoIP

- Modernizing SNA networks
  - Begin by updating the networking infrastructure
- Address today's requirements
  - Scalable / future-ready architecture
  - Support network growth
  - Evolve with growth
- Incorporate latest advances
  - Switch architecture
  - System resilience
  - Quality of service
  - Switch security



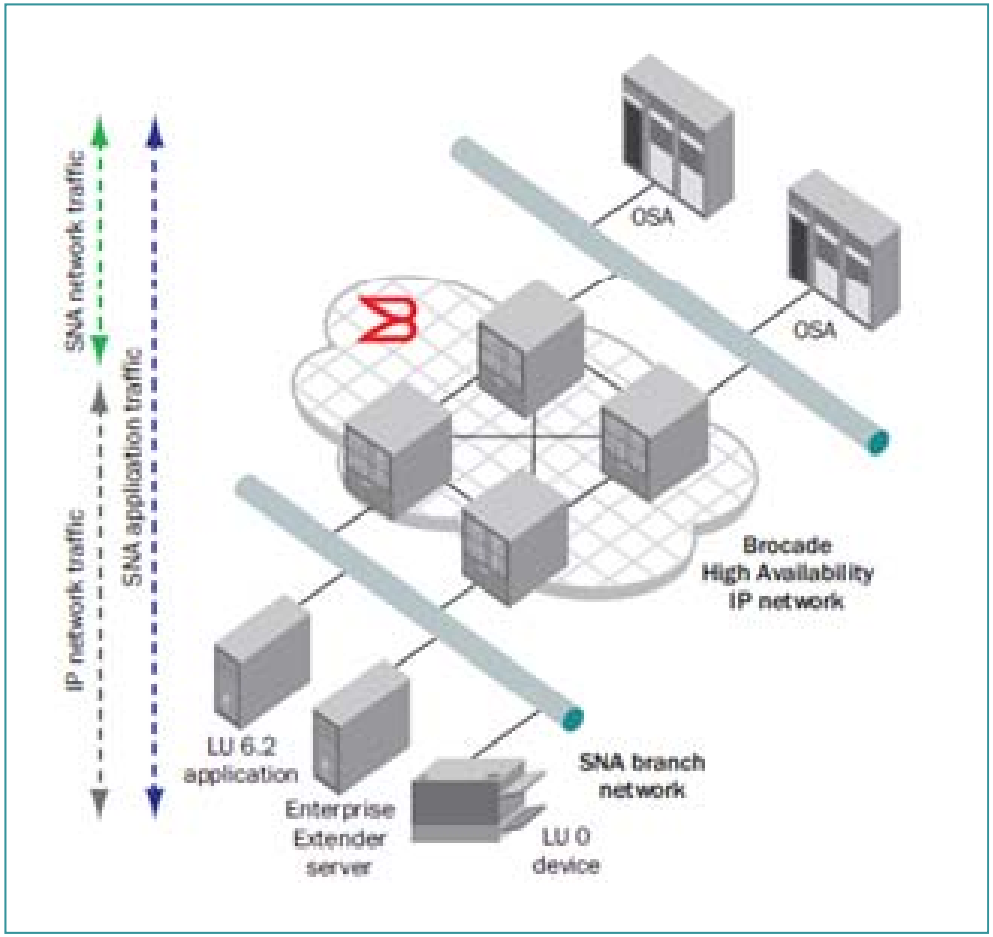
SNA over IP using Terminal Emulation

- SNA LU Type 2 devices
  - Most common interface to SNA applications
  - Connected by 3174 cluster controllers to 3745/46 communications controllers
- LU Type 2 replacement
  - Emulation applications running on intelligent workstations or PCs
- TN3270 emulation
  - Executing on PCs attached to the LAN
  - Clients connect to mainframe
    - zOS TN3270 servers over IP network via OSA adapters
- Data stream
  - Standard IP traffic to the data center
  - Bridged to the SNA network and applications



SNA over IP using Enterprise Extender

- SNA LU Type 6.2
- Enterprise Extender
  - Carries SNA (HPR) traffic of any LU type over an IP infrastructure
  - No changes required to infrastructure
  - Provides end-to-end SNA services
  - Can be deployed in hosts and intelligent workstations
  - Integrates SNA APPN technology
  - Allows preservation of SNA transmission priorities



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August 2010

THANK YOU!

REFERENCES

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