z/OS Introduction and Workshop

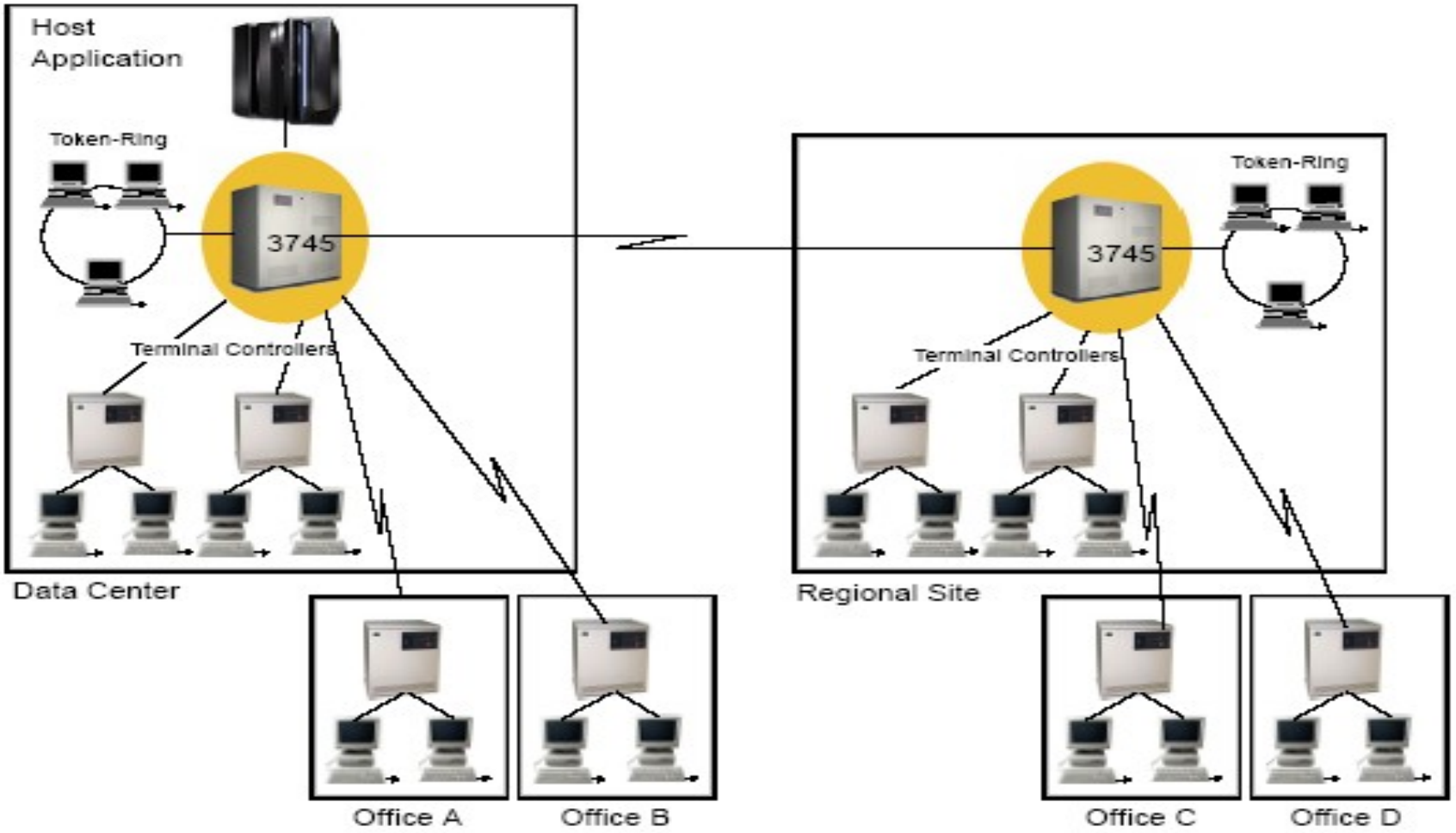
Communications Server

Unit Objectives

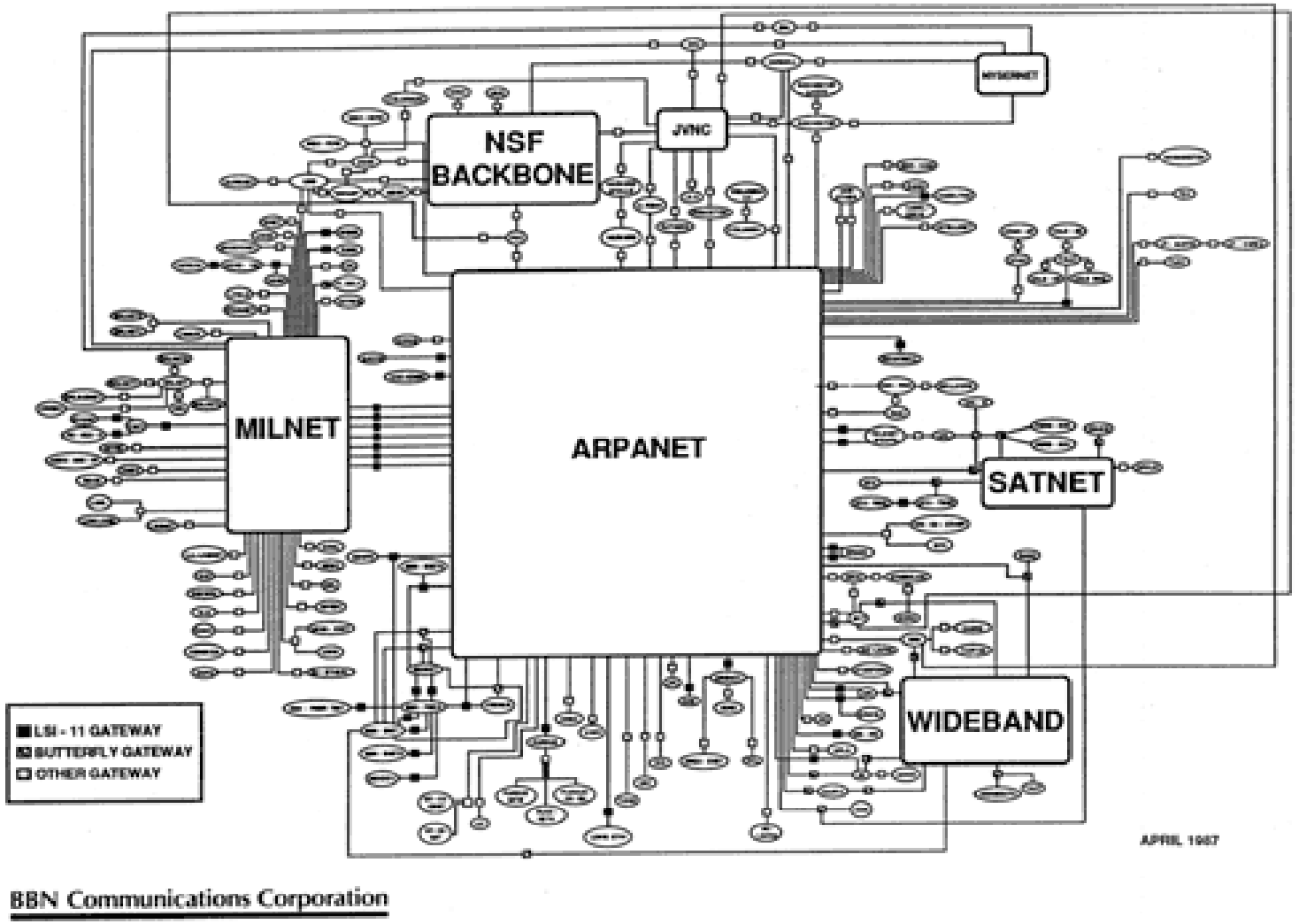
After completing this unit, you should be able to:

- Describe TCP/IP
- Describe SNA and VTAM
- List major components of Communications Server
- Describe z Systems OSA
- List network security features available with Communications Server

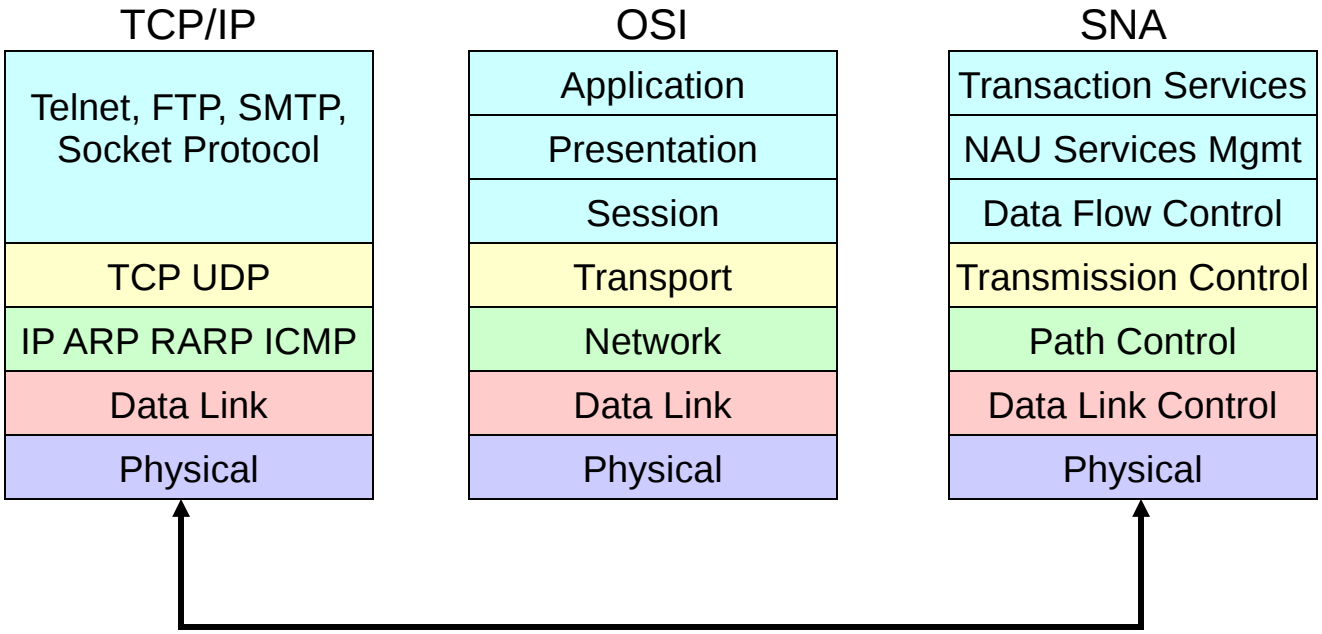
SNA Subarea Network - 1980's



TCP/IP ARPANET - 1980's



Open Systems Interconnect (OSI) network model



Communications Server - TCP/IP

IBM implementation of the standard TCP/IP protocol suite on the z/OS platform.

Provides the industry-standard TCP/IP protocol suite allowing z/OS environments to share data and computing resources with other TCP/IP computing environments.

When authorized. CS for z/OS IP enables anyone in a non-z/OS TCP/IP environment to access resources in the z/OS environment

Communications Server for z/OS

Supplied with z/OS and enabled by Unix System Services

Provides networking services (API) to SNA and TCP/IP applications

Connects the mainframe to the external world

3 Major Components

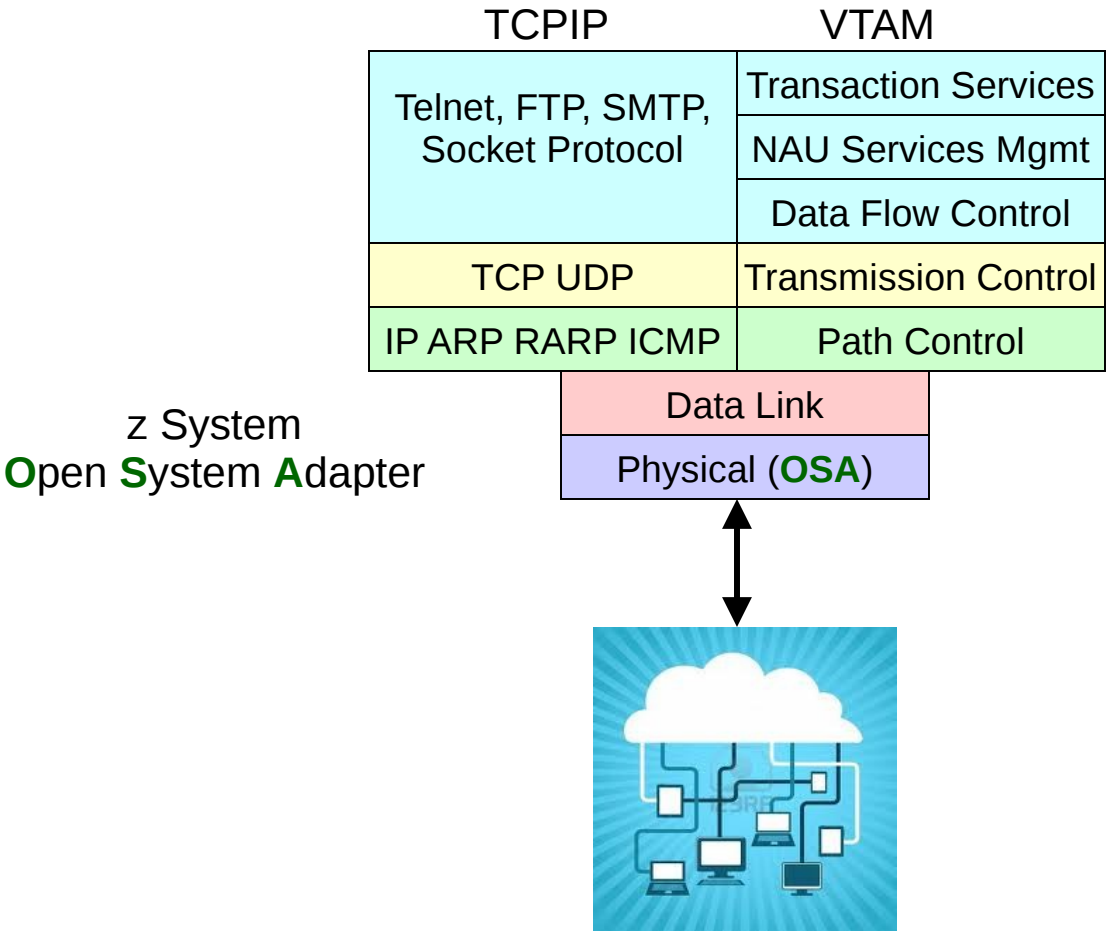
1. VTAM – Virtual Telecommunications Access Method (SNA)
2. CSM – Common Storage Management (controlled by VTAM)
3. TCPIP – Uses CSM for network IO buffering

VTAM & TCPIP Address Spaces

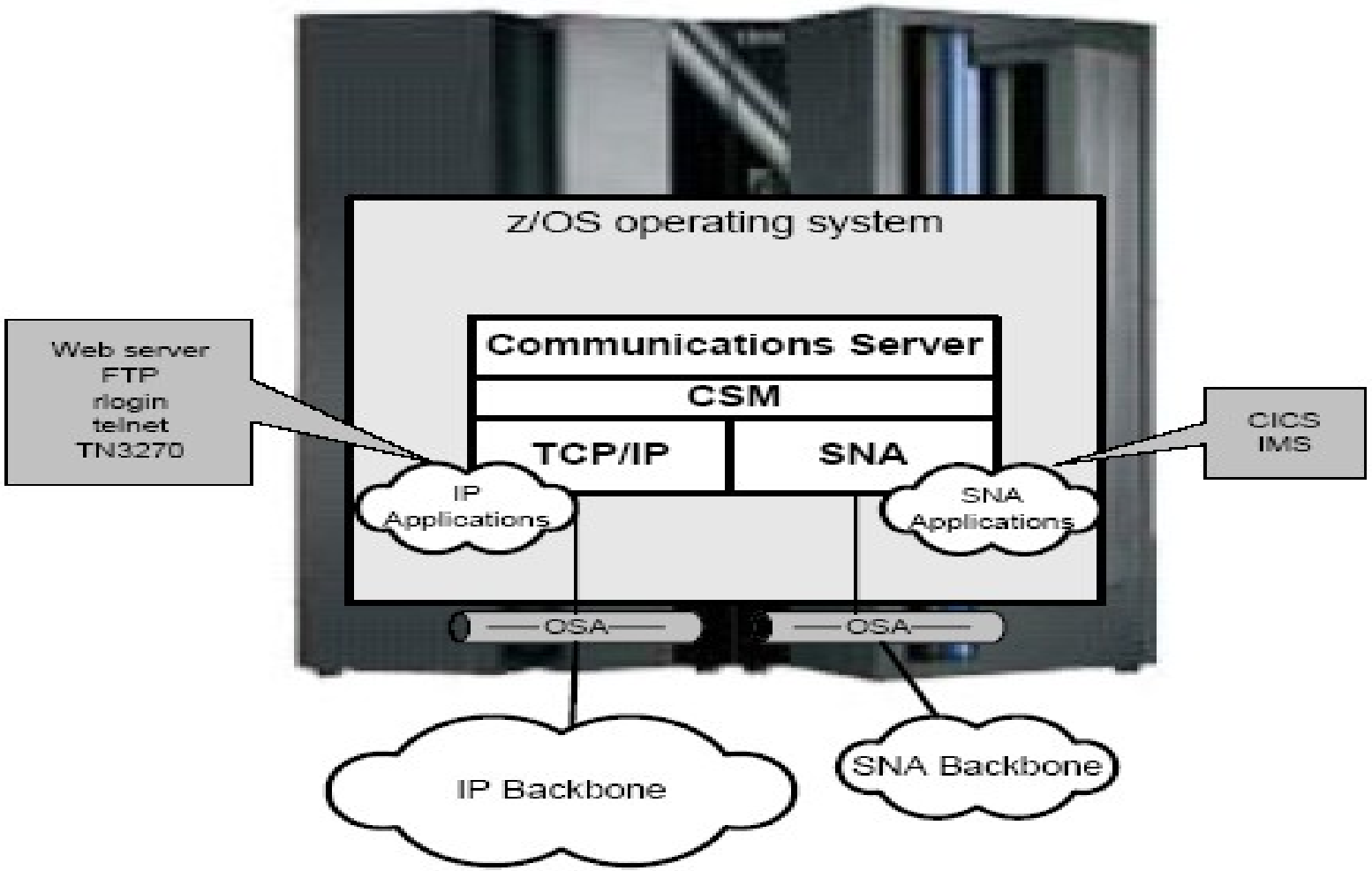
```
//VTAM   EXEC PGM=ISTINM01,REGION=5M
//VTAMLST DD DISP=SHR,DSN=VENDOR.VTAMLST
//         DD DISP=SHR,DSN=SVTSC.VTAMLST
//         DD DISP=SHR,DSN=LVL0.VTAMLST
//         DD DISP=SHR,DSN=SYS1.VTAMLST
//VTAMLIB DD DISP=SHR,DSN=VENDOR.VTAMLIB
//         DD DISP=SHR,DSN=SVTSC.VTAMLIB
//         DD DISP=SHR,DSN=LVL0.VTAMLIB
//         DD DISP=SHR,DSN=SYS1.VTAMLIB


//TCPIP   EXEC PGM=EZBTCPIP,PARM='&PARMS'
//STEPLIB  DD DISP=SHR,DSN=VENDOR.VTAMLIB
//         DD DISP=SHR,DSN=SVTSC.VTAMLIB
//         DD DISP=SHR,DSN=LVL0.VTAMLIB
//PROFILE  DD DISP=SHR,DSN=VENDOR.TCPPARMS(&SYSNAME)
//SYSTCPD  DD DISP=SHR,DSN=TCPIP.TCPIP.DATA
```

Communications Server



Communications Server for z/OS - Implementation



Communications Server for z/OS - Implementation

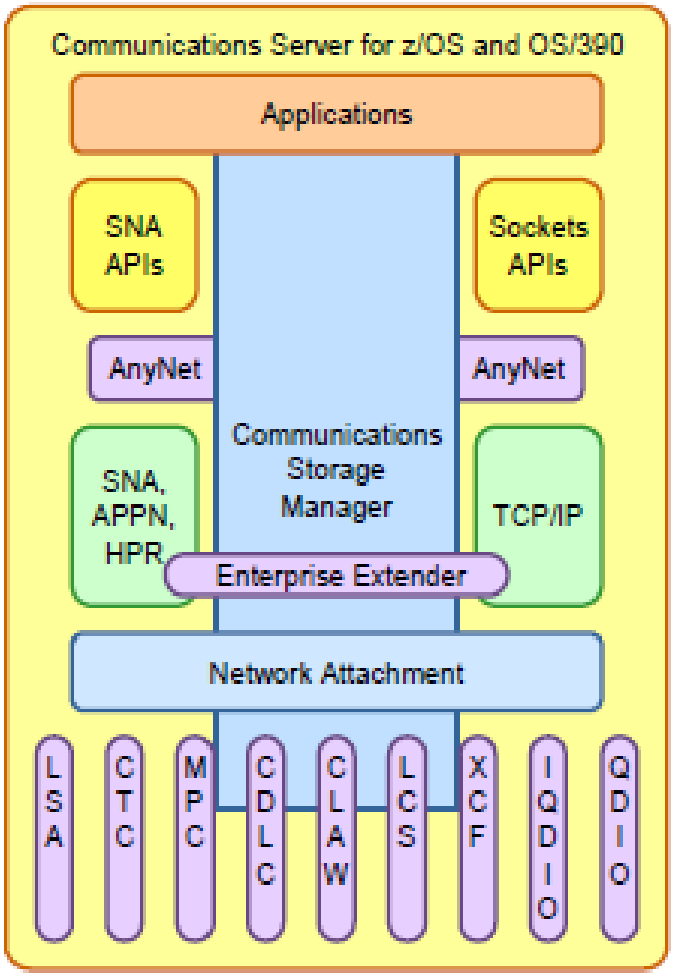
z/OS Communications Server (CS) Description

Integrated Services

- Provide common services within CS for z/OS and OS/390
  - Network attachment
  - Storage management
  - High Performance Data Transfer
- TCP/IP and SNA integration
  - TN3270
  - Network access
  - Internal optimizations
  - Enterprise Extender
- Standard TCP/IP applications

Multi-protocol Solutions

- Sockets (TCP/IP) applications
  - Unix services offers zSeries and s/390 users access to a wide range of UNIX-based applications over IP or SNA networks
- SNA applications
  - SNA applications are supported over SNA or IP networks



VTAM, CSM & TCPIP Commands

D NET ..... VTAM Commands
D NET ..... CSM Commands
D TCPIP .... TCPIP Commands

D NET,ID=OSATRL1E

```
PORTNAME = DEVOSA1    PORTNUM = 0
 WRITE DEV = 0401 STATUS = ACTIVE
 READ  DEV = 0400 STATUS = ACTIVE
 DATA  DEV = 0402 STATUS = ACTIVE
```

D NET,CSMUSE

```
AMOUNT OWNERID  JOBNAME
80K    0027     TCPIP
28K    0024     VTAM
```

D TCPIP,,NETSTAT,HOME

```
ADDRESS          LINK
204.90.115.184   OSDL
```

VTAM and TCPIP Setup

VTAM Parameters

```
OSATRL1 VBUILD TYPE=TRL
OSATRL1E TRLE LNCTL=MPC,
            READ=(0400),
            WRITE=(0401),
            DATAPATH=(0402),
            PORTNAME=DEVOSA1,

            MPCLEVEL=QDIO
```

D U,,ALLOC,400,3

```
UNIT    JOBNAME
0400    VTAM
0401    VTAM
0402    VTAM
```

TCPIP Parameters

```
DEVICE DEVOSA1  MPCIPA NONROUTER
LINK OSDL IPAQENET DEVOSA1
HOME
  204.90.115.184 OSDL
```

D TCPIP,,NETSTAT,HOME

```
HOME ADDRESS LIST:
ADDRESS          LINK
204.90.115.184   OSDL
```

Open Systems Adapter (OSA)

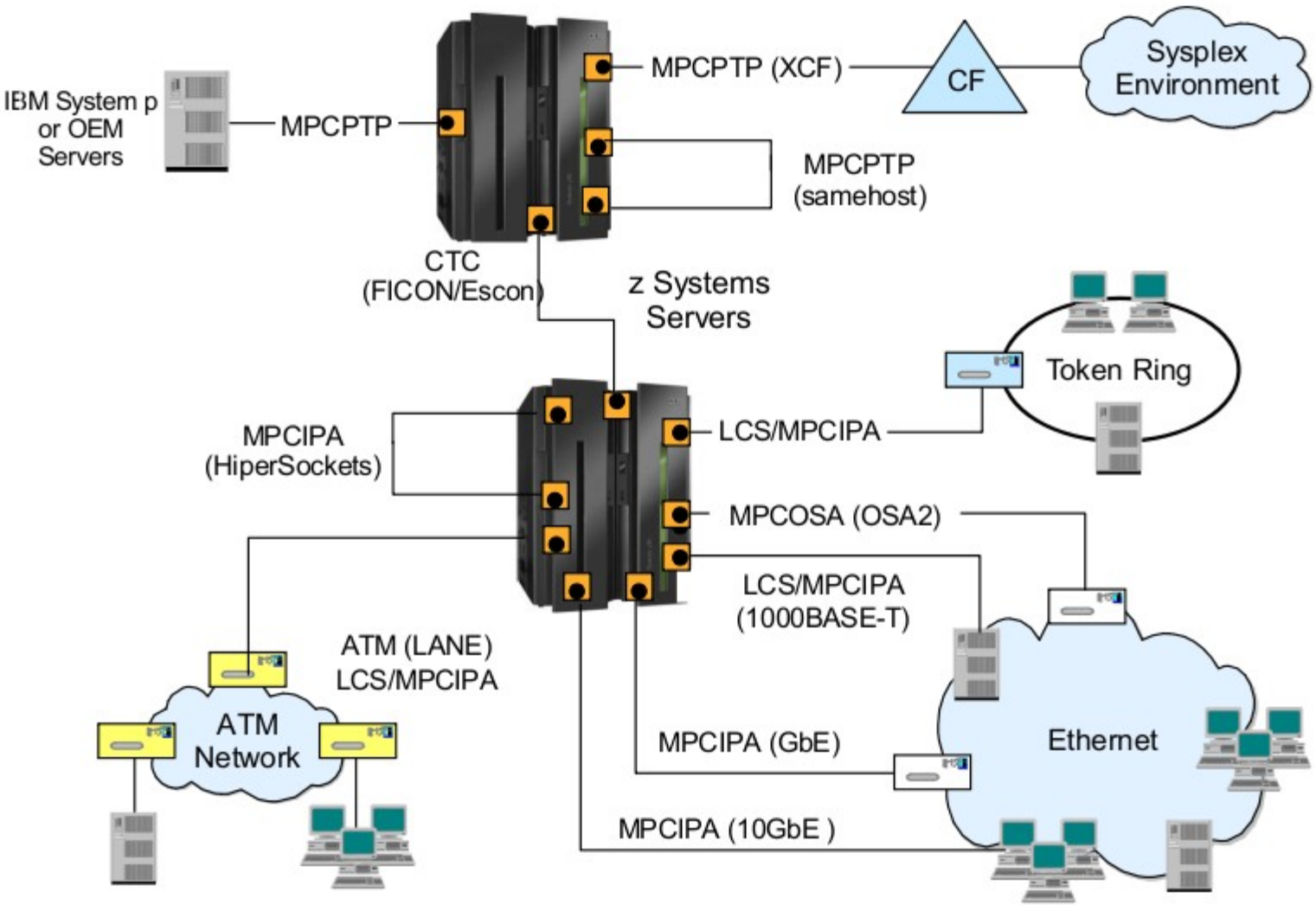
OSA-Express2 and OSA-Express comprise several integrated hardware features which can be installed in System z input/output (I/O) cage, becoming integral components of the server's I/O subsystems.

The OSA-Express2 10 GbE LR has one port, while the other OSA-Express2 and OSA-Express features have two independent ports that can be attached directly to a LAN.

The integration of a channel path with network port makes the OSA-Express a unique channel or channel path identifier (CHPID) type, recognized by the hardware I/O configuration as one of the following types:

- Queued Direct I/O (OSD)
- Non Queued Direct I/O (OSE)
- OSA-Express Integrated Console Controller (OSC)
- Open System Adapter for Network Control Program (OSN)

OSA Connectivity Options

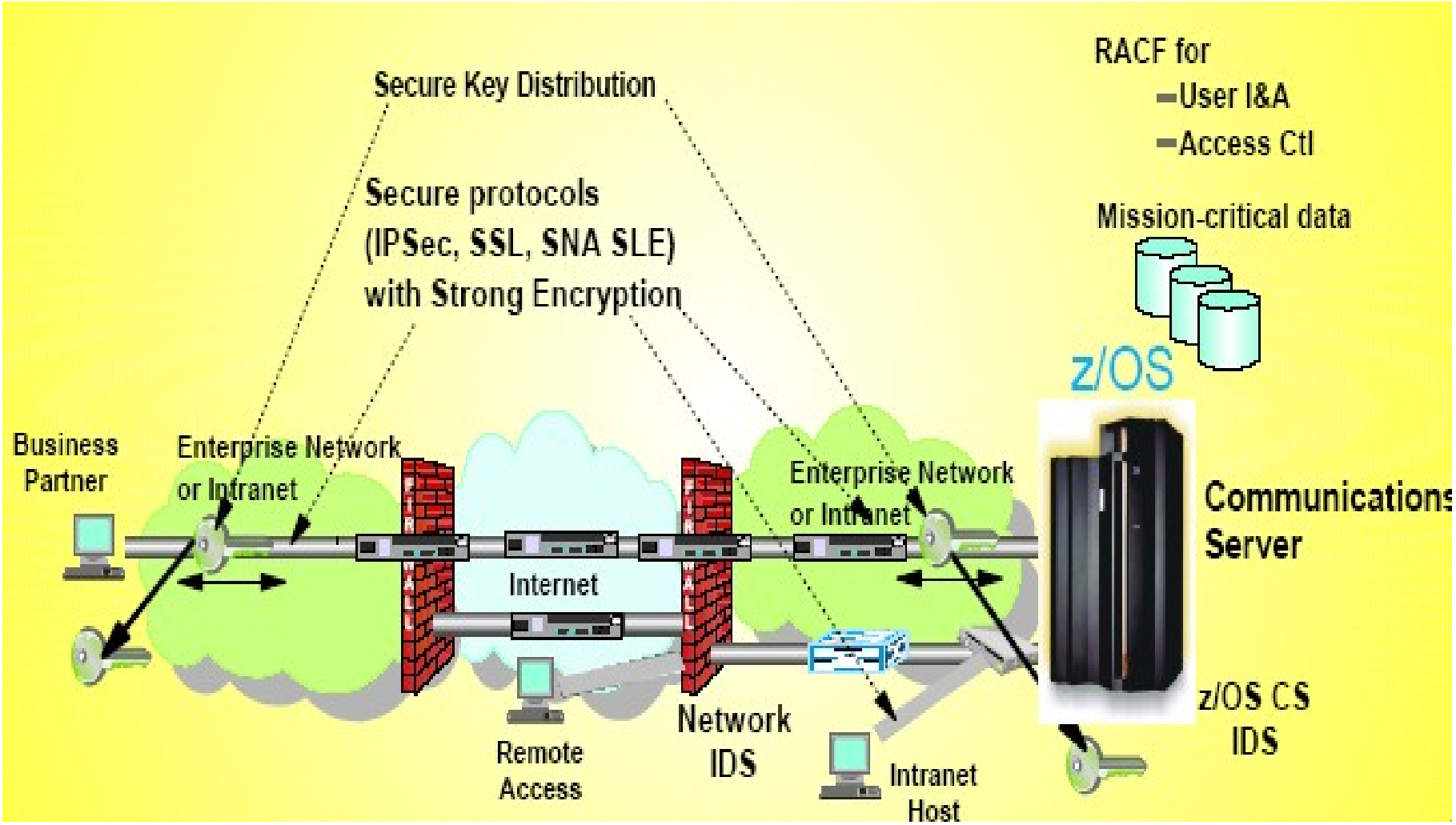


HiperSockets & VSwitch

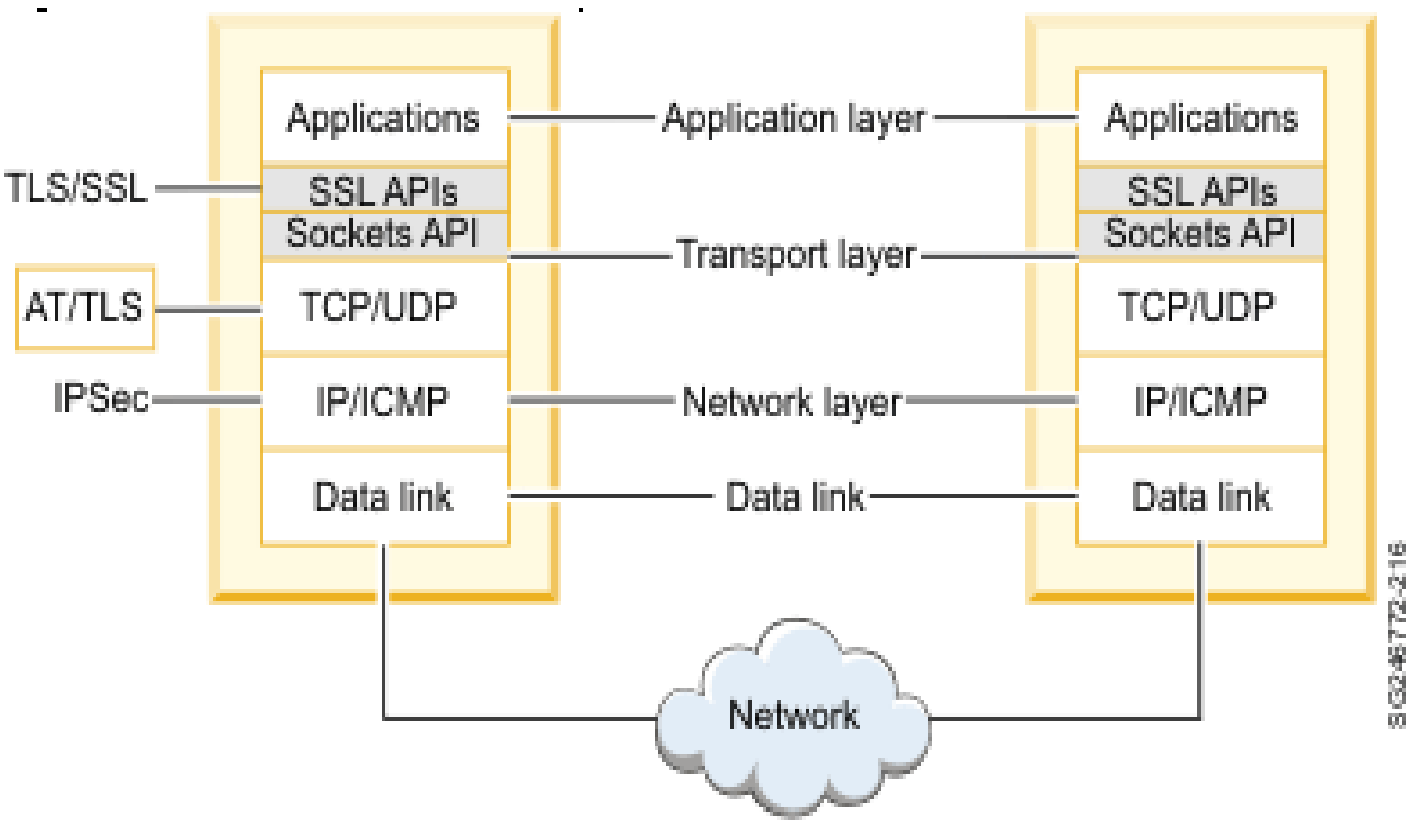
System z provides high-speed TCP/IP connectivity between operating systems within a System z eliminating need for any physical cabling or external networking connection between these virtual servers.

The network delay between operating systems is near zero.

Security

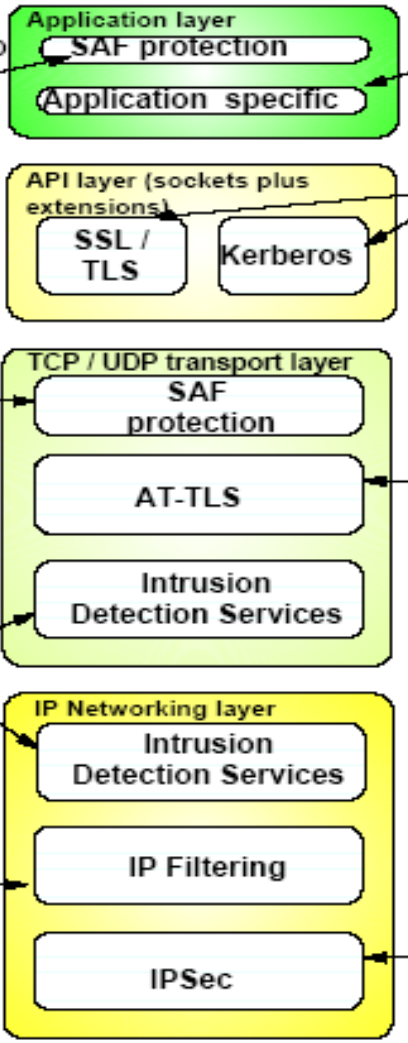


Communications Server Security Capabilities



Protocol Stack View of TCP/IP Security Functions

Protect the system
z/OS CS TCP/IP applications use SAF to authenticate users and prevent unauthorized access to datasets, files, and SERVAUTH protected resources..



Protect data in the network
Examples of application protocols with built-in security extensions are SNMPv3, DNS, and OSPF.

Both Kerberos and SSL/TLS are located as extensions to the sockets APIs and applications have to be modified to make use of these security functions. Both SSL/TLS and Kerberos are connection-based and only applicable to TCP (stream sockets) applications, not UDP.

The SAF SERVAUTH class is used to prevent unauthorized user access to TCP/IP resources (stack, ports, networks)

AT-TLS is TCP/IP stack service that provides SSL/TLS services at the TCP transport layer and is transparent to upper-layer protocols. It is avaliable to TCP applications in all programming languages except PASCAL.
New in z/OS V1R7

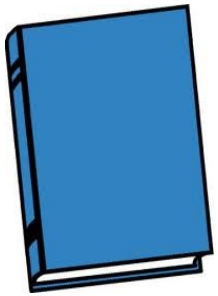
Intrusion detection services protect against attacks of various types on the system's legitimate (open) services. IDS protection is provided at both the IP and transport layers.

IP packet filtering blocks out all IP traffic that this systems doesn't specifically permit.

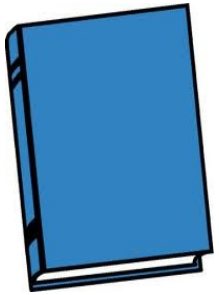
IPSec resides at the networking layer and is transparent to upper-layer protocols, including both transport layer protocol and application protocol.

Professional Manuals and Information

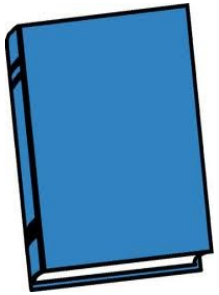
z/OS Communications Server Bookshelf



z/OS Communications Server TCPIP Implementation:Standard Applications



z/OS Communications Server TCP/IP Implementation: Base Functions



Unit summary

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