S/390 Enterprise Server Access Gateway Performance

Part 4 - Testing Background

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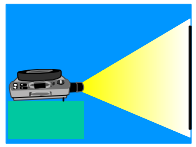


Content

► IBM S/390 Server Access Leadership

- ➡ Part 1 : Considerations for S/390 Server Access
- ➡ Part 2 : Leadership in TCP/IP networking
- ➡ Part 3 : Excellence in SNA networking
- ➡ Part 4 : Testing Background
- ➡ Part 5 : WSC performance testing results
- ➡ Part 6 : Why Choose IBM for S/390 Server Access

Performance Testing Chronology

Phase 1

- Performed in 1H96 in La Gaude
- Testing with mainly Cisco 7000
- Some testing at Customer location with Cisco 75XX

Phase 2

- Performed YE96 in RTP
- Testing with Cisco 75XX machines

Phase 3

- Testing performed at the Washington System Center (WSC) with the upgraded Cisco 75XX machines.
- (See Freelance file : IBMGWAY5.PRE for a detailed presentation)

Phase 1

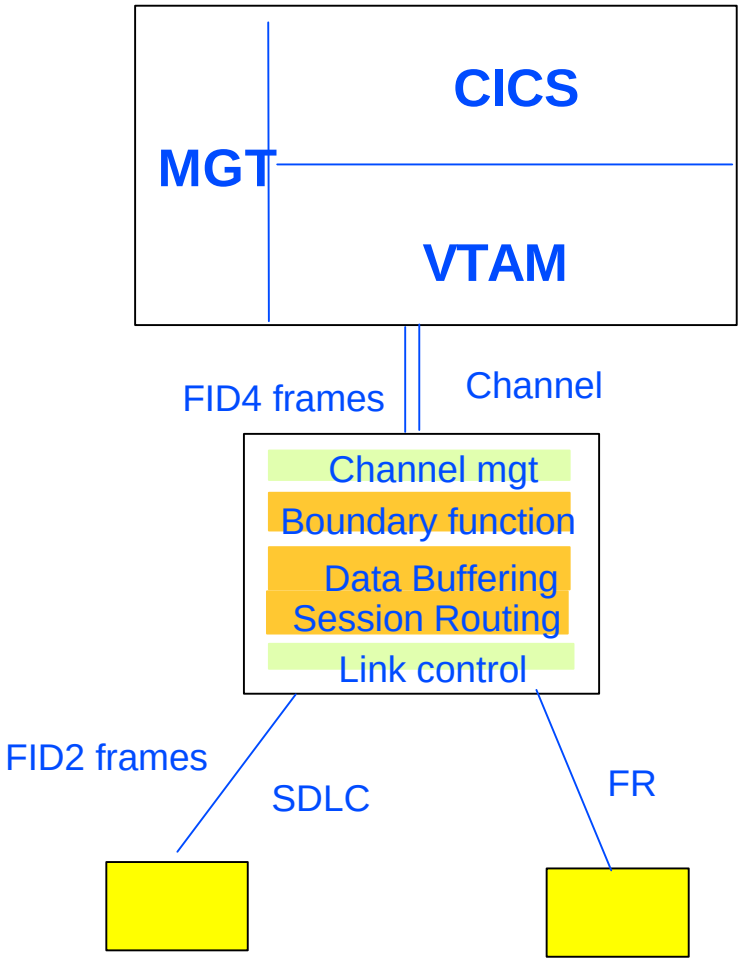
Testing at IBM Lab, LaGaude
1H1996

Performance Testing - 1H96

SNA Environment

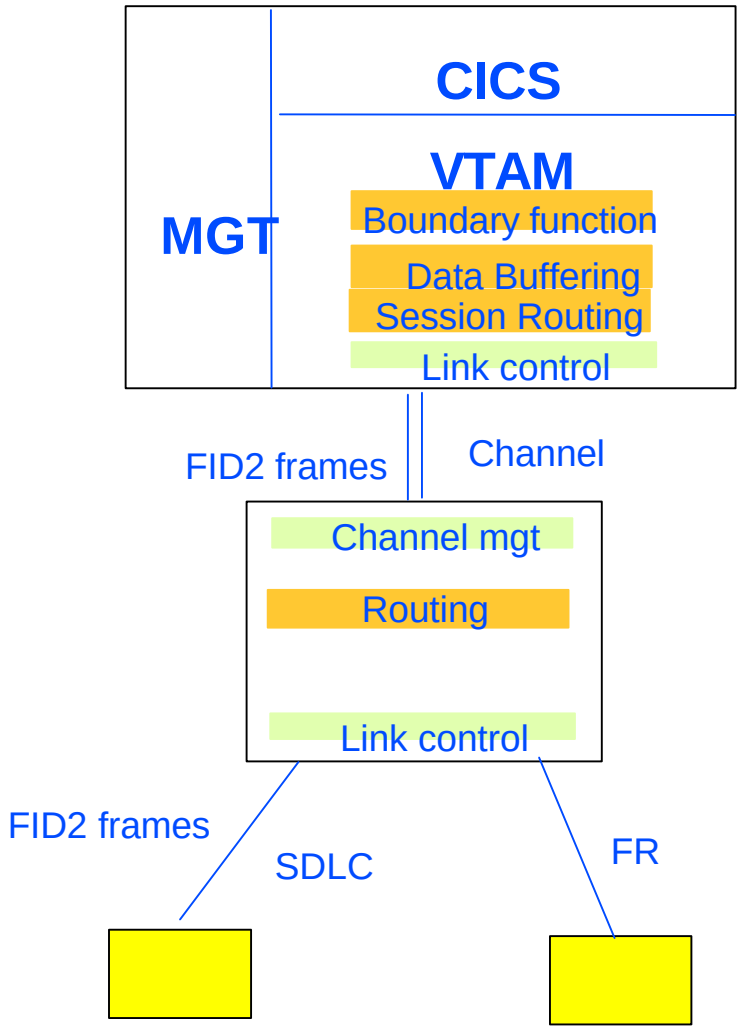
- IBM 3746-9x0 fully supports native APPN over the ESCON channel and through all LAN and WAN attachments
- Cisco 7x00 only supports native APPN over LAN/WAN attachments, not over the channel
- IBM 3746-9x0 APPN performs 11 times faster than the Cisco 7000 in Transaction type of traffic
- IBM 3746-9x0 APPN performs 15 times faster than the Cisco 7000 in File Transfer type of traffic
- IBM 3746-900 supports Subarea Boundary function (PU4), Cisco 7x00 does not

3745/6 SNA Sub area Functions



- **Channel Support**
  - ✓ CDLC(Subarea, APPN, HPR)
- **Link Support**
  - ✓ SDLC device polling/priority
  - ✓ FR & LAN LLC2 acknowledgement
- **Boundary Functions (BNN)**
  - ✓ Segmentation/reassembly
  - ✓ Device control block/buffer allocation/mgt
  - ✓ FID2 to FID4 conversion
  - ✓ PIU chaining
  - ✓ Network mgt support-NPM, NTunMon
- **Global Flow Control**
  - ✓ Session pacing/windowing
- **Session Routing**
  - ✓ Multi-hosts/INN/SNI
- **Frame Relay DCE/DTE support**

Router Functions



- **Router cycles**
- **Channel Support**
  - ✓ LSA (SNA, APPN)
- **Link Support**
  - ✓ SDLC device polling
- **Routing**
- **VTAM cycles**
- **Boundary Functions (BNN)**
- **LLC2 Acknowledgement**
- **Flow Control**
  - ✓ Session pacing/windowing
- **Session Routing**
  - ✓ Multi-hosts/INN
- **NO support**
- **Global flow control**
- **Frame Relay DCE support**
- **SNI support**

Performance Testing - 1H96

IP Environment

- IBM 3746-9x0 and Cisco throughputs in a host Telnet environment are about equal
- IBM 3746-9x0 box throughput in TCP/IP file transfer mode using FTP is 25 MBytes
- According to the World Wide WEB , Cisco 7000 CIP card performance in TCP/IP file transfer mode using FTP is 7 MBytes
- IBM 3746-9x0 box throughput in a LAN environment is comparable to Cisco 7513 today (largest router of Cisco 7500 family)
- The 4 ports TR adapter of the Cisco 7x00 drives only 2 ports at media speed (98% adapter load with 2 ports)

Analysis of performance from 1H96 tests

- Cisco 7X00 used up 47% more network CPU cycles for SNA subarea traffic
  - Based on customer testing as well as testing in La Gaude
  - Contributing factors are:
    - Cisco uses LSA channel protocol vs IBM CDLC
    - Boundary function processing moved to VTAM in Cisco solution
- Adding APPN/DLUR to increases network CPU by about 3% for Cisco and IBM
  - This means Cisco 7X00 will require 50% additional CPU vs IBM 3%
- Cisco claim of 1 to 3% increase in CPU cycles is based on testing with first generation 3745
- Cisco CIP delivers only 7MB on a single ESCON and only 9MB with dual ESCON
  - Based on list prices, IBM ESCON attachment prices are less that Cisco's prices
- Bottom line: Though the actual savings realized in a particular Customer network will vary, there potential for a significant increase in host cycle consumption in a Cisco's channel attached router solution for SNA traffic.

Phase 2

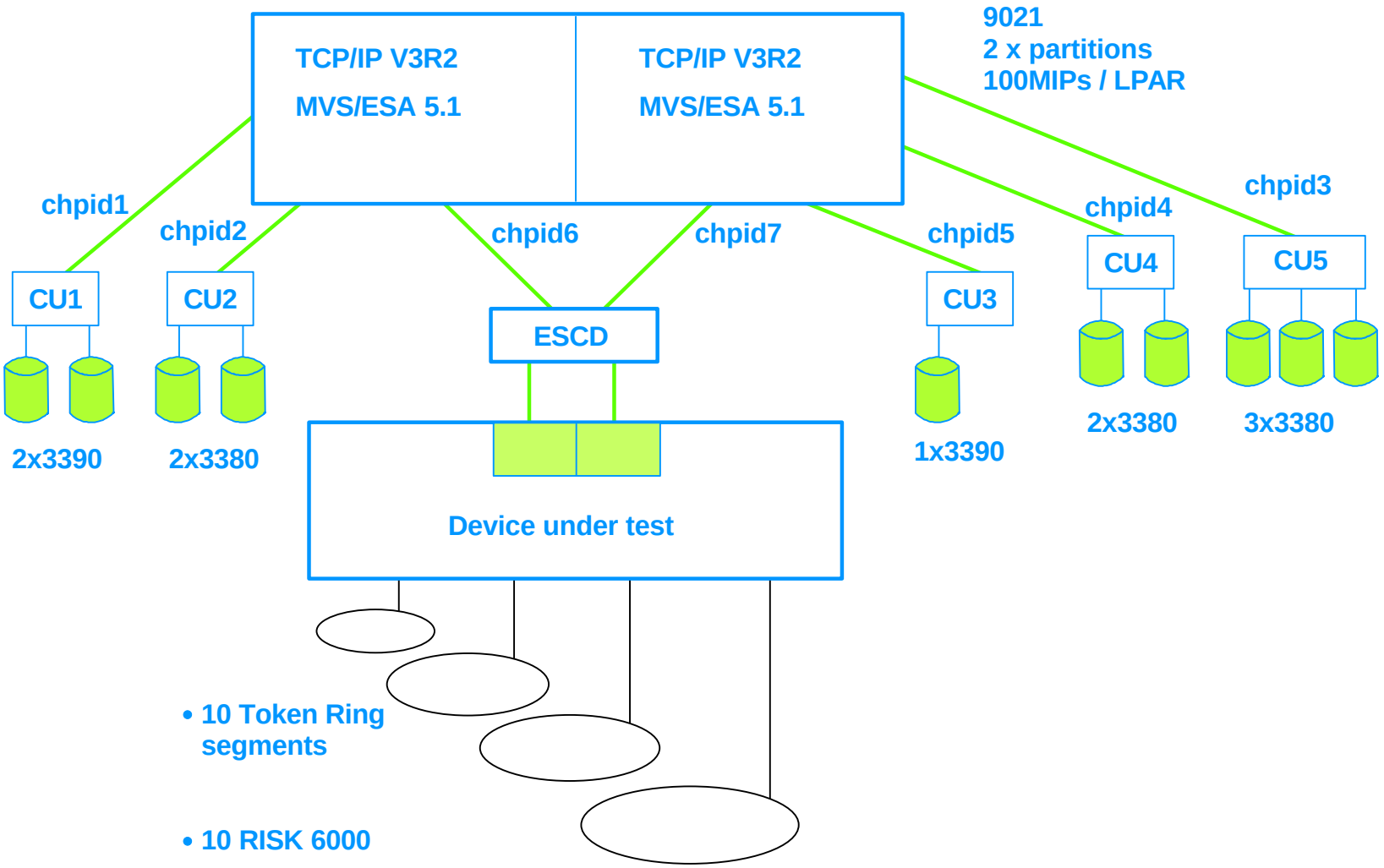
Testing at IBM Lab, RTP
2H1996

Cisco 7513 - IP over ESCON (Phase 2)

Solution	1 x CIP2 Escon	1 x CIP2 dual Escon
Performance	7 Mbytes (**)	9 Mbytes (**)
Processor	RSP2	RSP2
List Price	$40K	$59K

(**) see configuration details

IBM 3746-9x0 vs Cisco 7513 - IP (Phase 2)



IBM 3746-9x0 vs Cisco 7513 - IP (Phase 2)

Configuration details

- **Disks**
  - 5 control units
  - 7 DASD 3380
  - 3 DASD 3390
  - 1 control unit per chpid
- **Host : 9021**
  - 2 LPARS
  - 100 MIPS/partition
  - MVS Native MVS/ESA 5.1
  - CHPID limit : 6 Mbytes on this 9021
  - 1/ESCON/chpid/partition to the device under test

IBM 3746-9x0 vs Cisco 7513 - IP (Phase 2)

9 Mbytes Analysis

- **Heavy configuration HOST/DISK/CHPID**
- **Network requirements to drive 9 Mbytes to the host**
  - **4 x E3 (60 % max utilisation with IP)**
    or
  - **1 x FDDI fully used with all traffic for the host**
    or
  - **5 TR segments fully used with all traffic for the host**
- **IP : 60 to 70 % max link utilisation on WAN**