z/OS V1R2 Communication Server Performance Summary

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Notes:

Performance is in Internal Throughput Rate (ITR) ratio based on measurements and projections using standard IBM benchmarks in a controlled environment. The actual throughput tha user will experience will vary depending upon considerations such as the amount of multiprogramming in the user's job stream, the I/O configuration, the storage configuration, and the processed. Therefore, no assurance can be given that an individual user will achieve throughput improvements equivalent to the performance ratios stated here.

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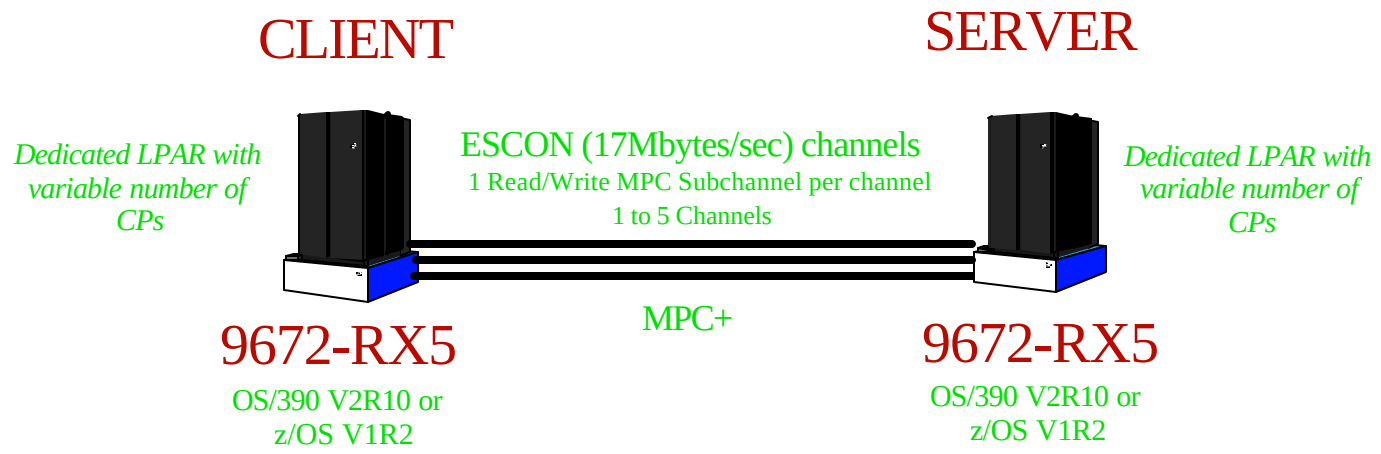
- The performance data discussed in this presentation was collected in dedicated system environments. Therefore, the results obtained in other configurations or operating system environments may vary.

Agenda

- z/OS V1R2 vs OS/390 V2R10 Performance Comparison
  - Netmarks Primitives (RR, CRR, Streams)
  - FTP Server
  - Claw Packing
- z/OS V1R2 Performance
  - TN3270
  - Web Server (using FRCA)
- OS/390 V2R10
  - Sysplex Distributor vs Forwarding Router Stack
- Summary

z/OS V1R2 Comm. Server Perf. Summary

- Performance Testbed for
  CS/390 Release to Release Performance Tests :



- Performance Workload :

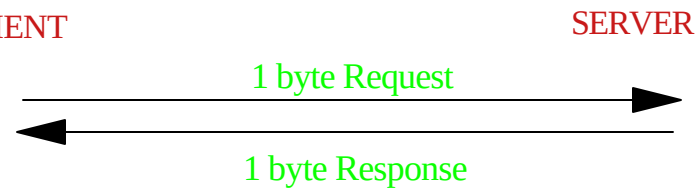
  Netmarks Primitives (RR, CRR, Streams)

z/OS V1R2 Comm. Server Perf. Summary

PRIMITIVE WORKLOADS FOR TCP/IP

RR Workload

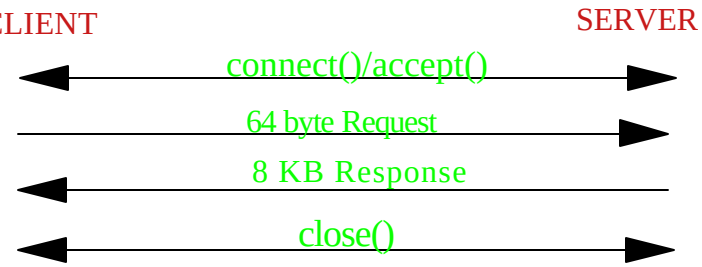
- Simulate TN3270
- Interactive workloads



- 1 MPC+ Channel
- 1-50 connections

Connect-Request-Response (CRR) Workload

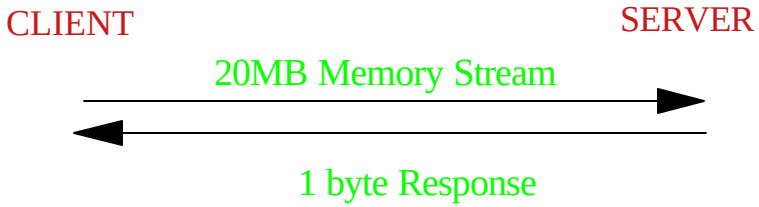
- Static Web Serving



- 1-3 MPC+ Channels
- 1-51 Connections

Streams Workload

- Simulate FTP
- Bulk data transfers applications such as ADSM, DB/2
- Memory to Memory (no DASD)



- 1-5 MPC+ Channels
- 1-50 Connections

z/OS V1R2 Comm. Server Perf. Summary

- Release to Release Comparison:
  - Netmarks Primitive Benchmarks

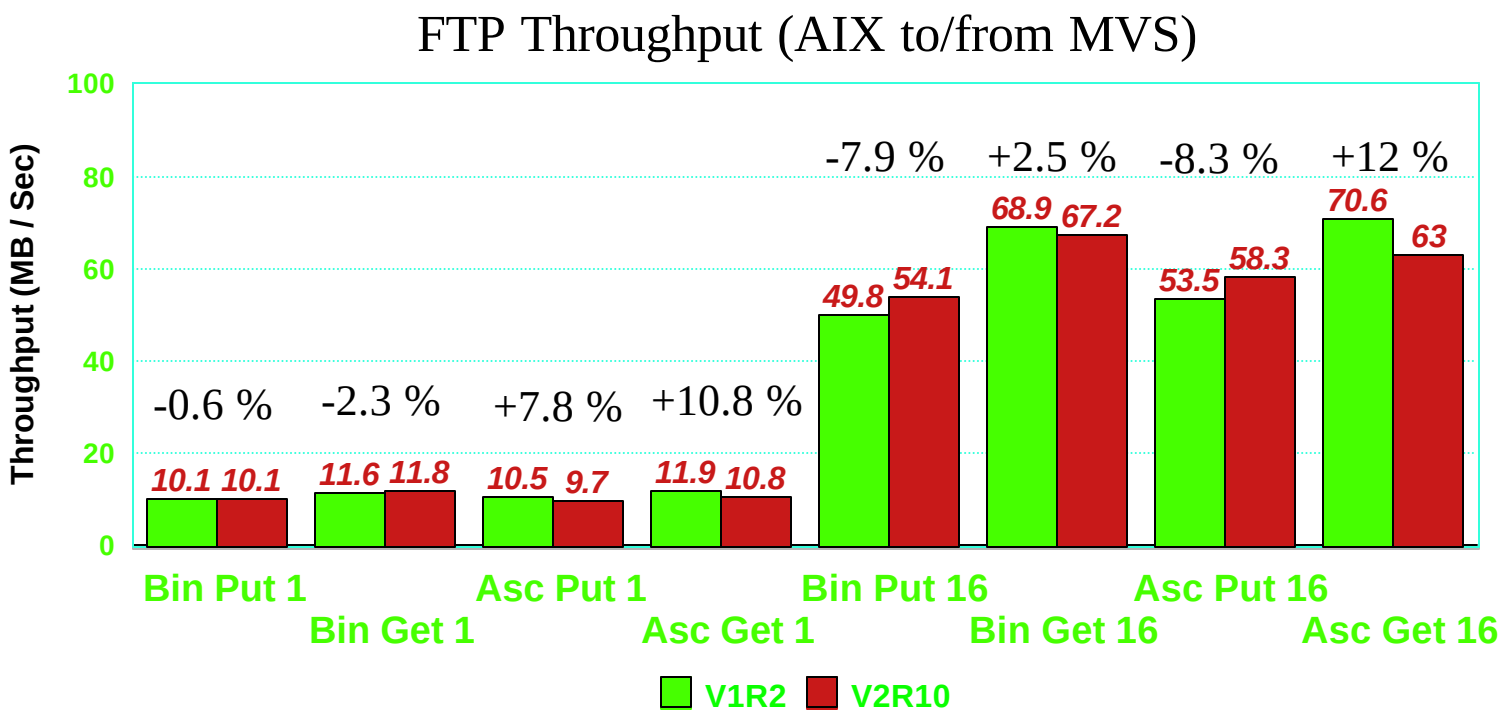
z/OS V1R2 vs OS/390 V2R10 (MVS to MVS)

Workload	# Sessions	TPUT Ratio (+ is good)	Response Time Ratio (- is good)
RR (interactive)	1, 10, 50	+ 4.84 %	- 4.3 %
CRR (web like)	1, 9, 51	+ 3 %	+ 2.5 %
Streams (bulk data xfer)	1, 50	+ 6.22 %	- 5.5 %

Throughput Ratio (V1R2 / R10): + 3 to + 6.22 %
Response Time Ratio (V1R2 / R10): - 5.5 to + 2.5 %

z/OS V1R2 Comm. Server Perf. Summary

- FTP Server (Throughput):
  - V1R2 Single session FTP throughput ranges from -2.3 to + 10.8 % vs V2R10 (Avg = + 3.75 %)
  - V1R2 Multi session (16) FTP throughput ranges from -8.3 to + 12 % vs V2R10 (Avg = + 0.08 %)



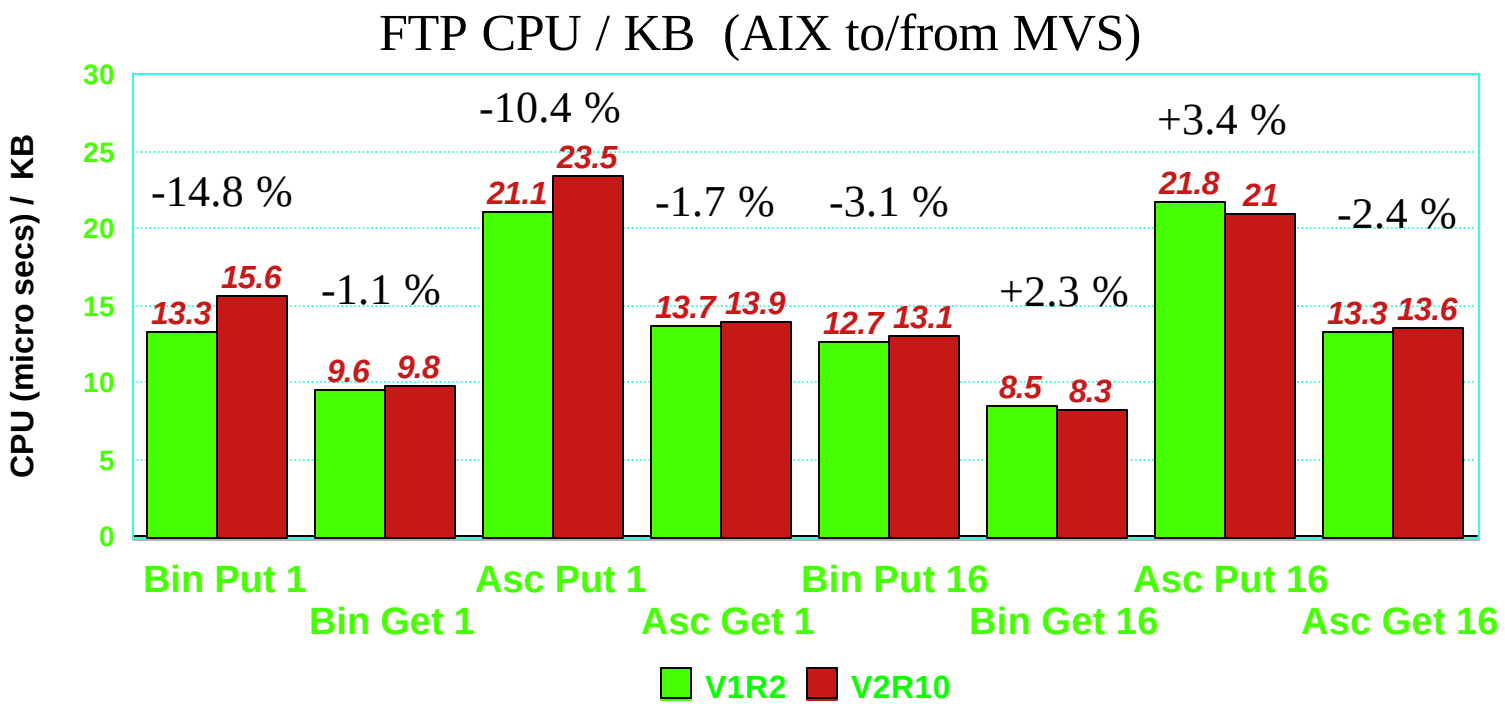
Put: AIX -----> MVS, Get: AIX <------ MVS

Config: AIX WS (1 or 4)---GbE---Switch----OSAE/GbE---2064-108 (4 CPs)

DASD Config: 3 Banks of Shark DASD (6 Chipids)

z/OS V1R2 Comm. Server Perf. Summary

- FTP Server (CPU/KB):
  - V1R2 Single session FTP CPU/KB ranges from -1.1 to -14.82 % vs V2R10 (Avg = - 8.12 %)
  - V1R2 Multi session (16) FTP CPU/KB ranges from -3.1 to + 3.43 % vs V2R10 (Avg = + 0.32 %)



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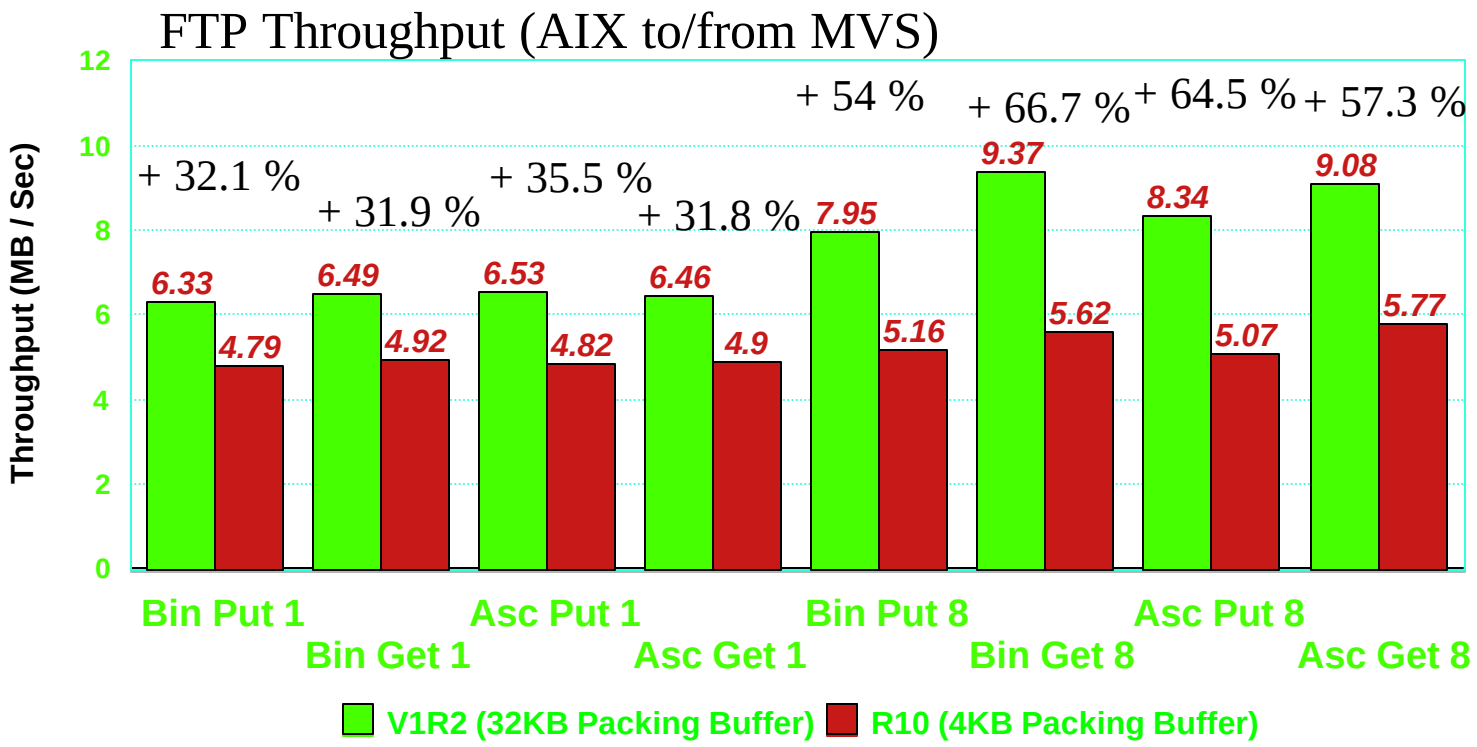
z/OS V1R2 Comm. Server Perf. Summary

CLAW Packing

- Pack multiple datagrams into a single claw channel frame
- V1R2 FTP throughput increases from 31 to 66 % vs R10
- Recommended for all customers using Cisco 7200/7500 routers using CLAW protocol



Put: AIX -----> MVS, Get: AIX <------ MVS

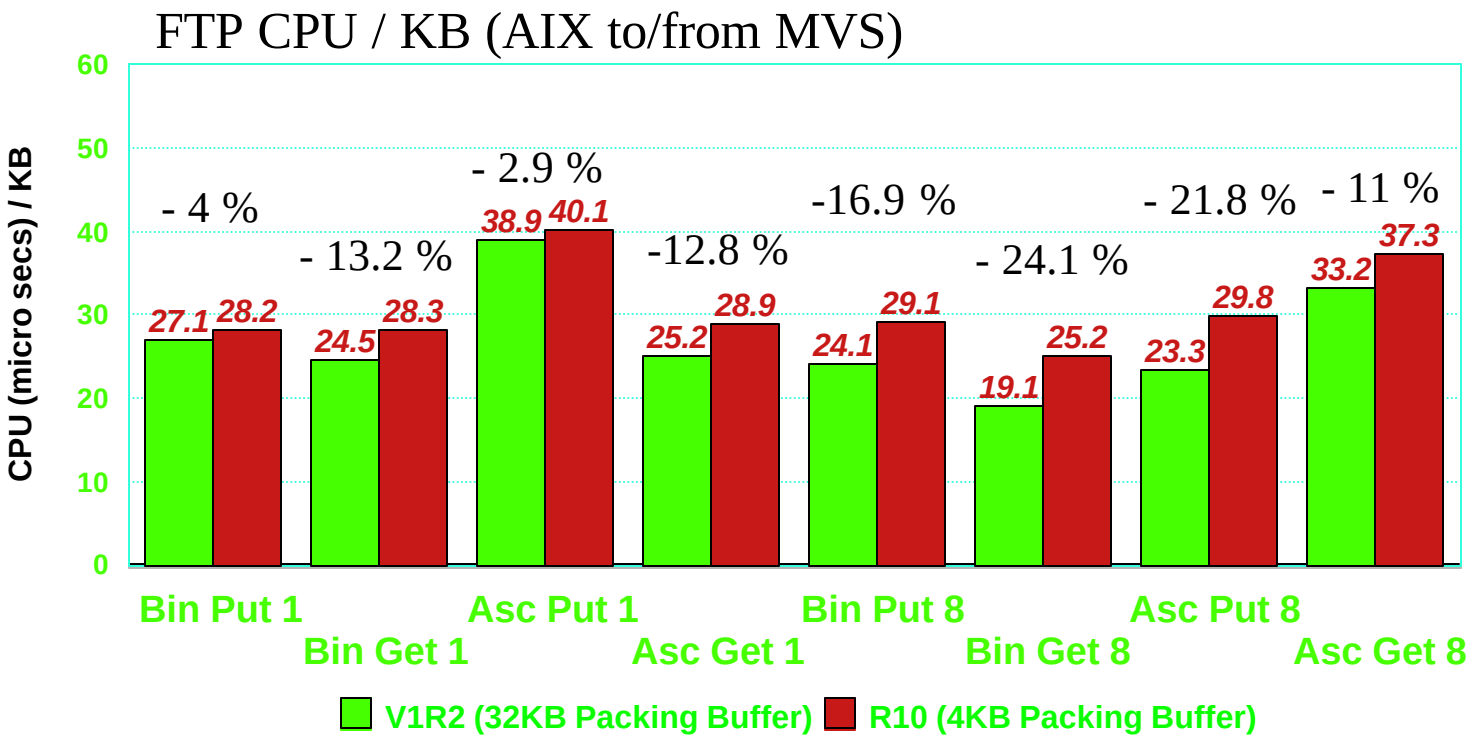
Config: AIX WS (1 or 4)---FE---Switch--FE--Cisco Rtr 7505---ESCON---9672-RX6 (4 CPs)

DASD Config: 1 Banks of Shark DASD (4 Chipids)

z/OS V1R2 Comm. Server Perf. Summary

CLAW Packing

- Pack multiple datagrams into a single claw channel frame
- V1R2 FTP CPU/KB is reduced from 3 to 24 % vs R10
- Recommended for all customers using Cisco 7200/7500 routers using CLAW protocol



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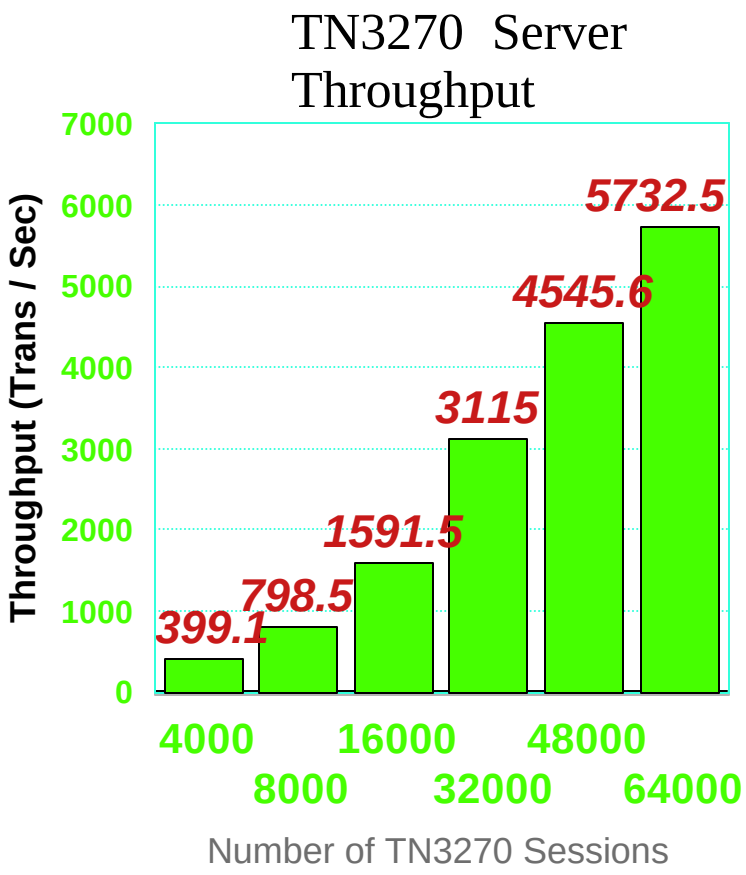
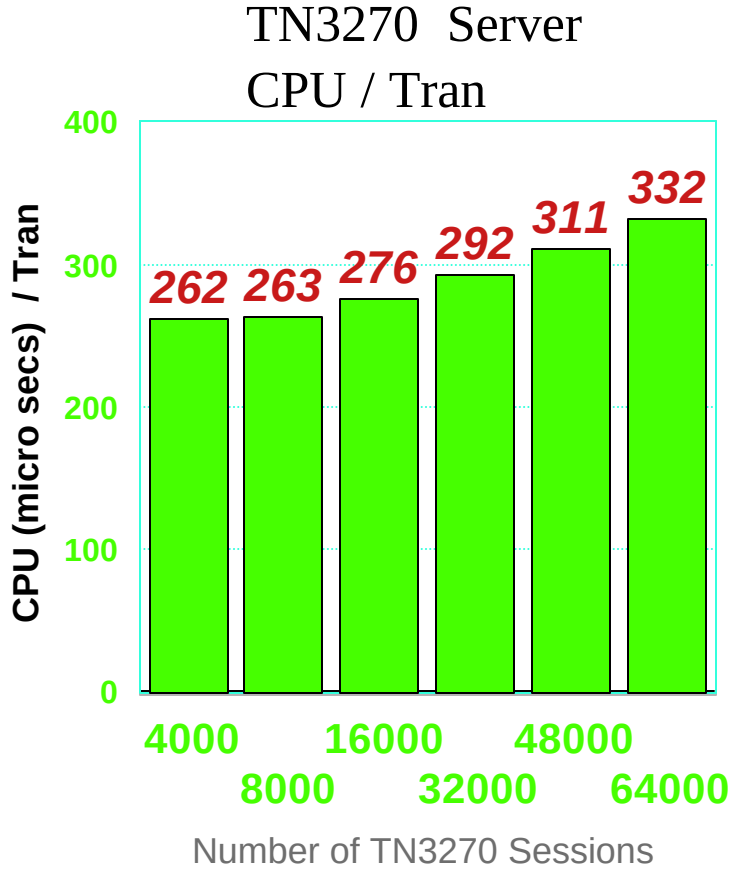
z/OS V1R2 Comm. Server Perf. Summary

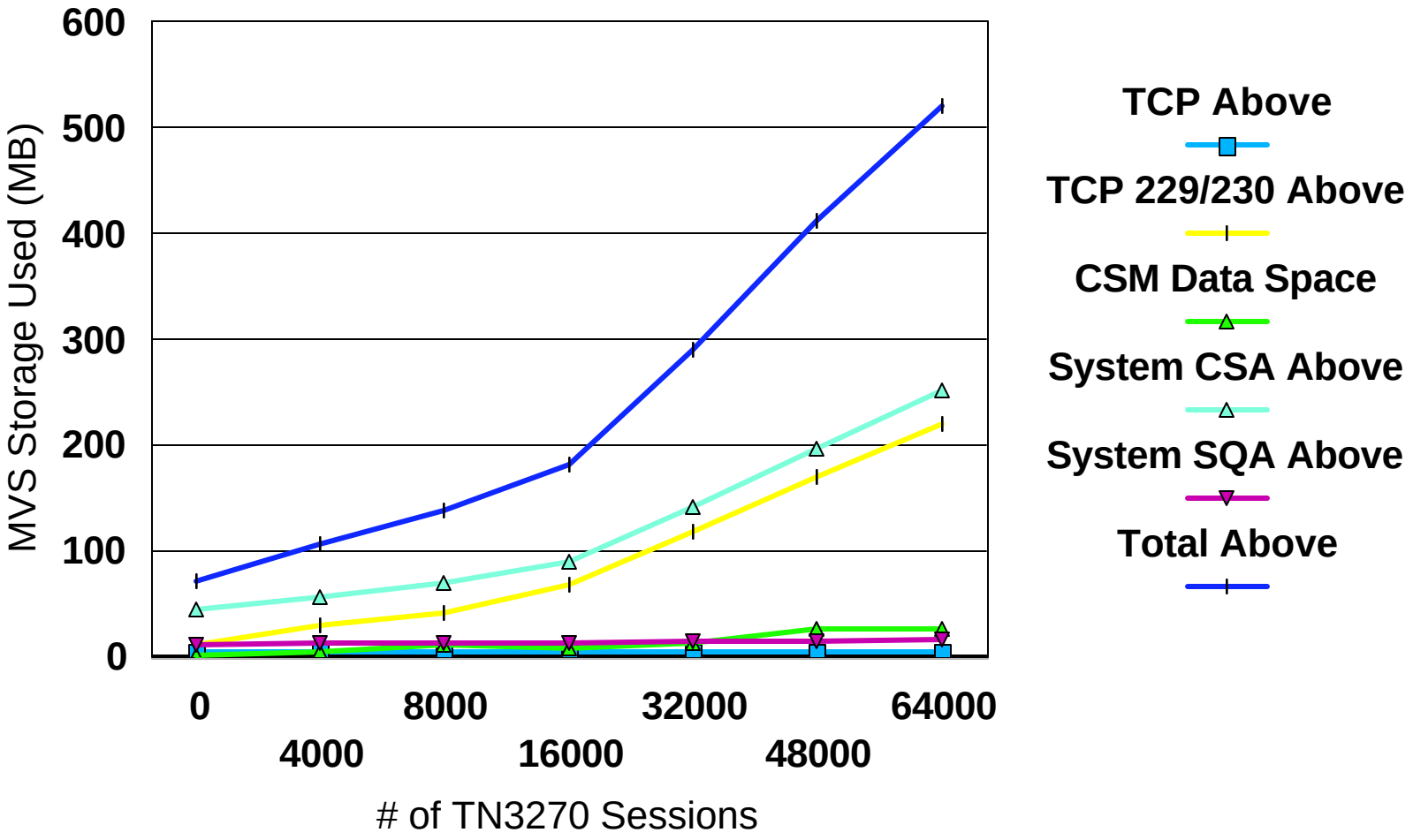
- TN3270





Tran: 100 bytes in / 800 bytes out # clients = 4000 to 64000
Config: 2064-108 (4 CPs, Clients)----OSA-Express/GbE (2)----2064-108 (4 CPs, Server)
Client: 4 TPNS's simulating TN3270 clients
Server: 4 ITPECHO applications, TN3270 Server
Transaction Rate: 6 / minute / user (10 sec Think Time)
CPU : TCP/IP + VTAM + ITPECHO CPU Time

Telnet (TN3270) Storage Utilization (CS/390 V1R2)



Storage usage (Above 16M line) of TCP/IP Addr Space and MVS System Storage (SQA, CSA) during TN3270 echoes (4000 to 64000 users) when using CS/390 V1R2 .

Delta Per User Total: 6.94 to 8.66 KB / user (4000 to 64000 TN3270 sess.)

Telnet (TN3270) Storage Utilization (CS/390 V1R2)

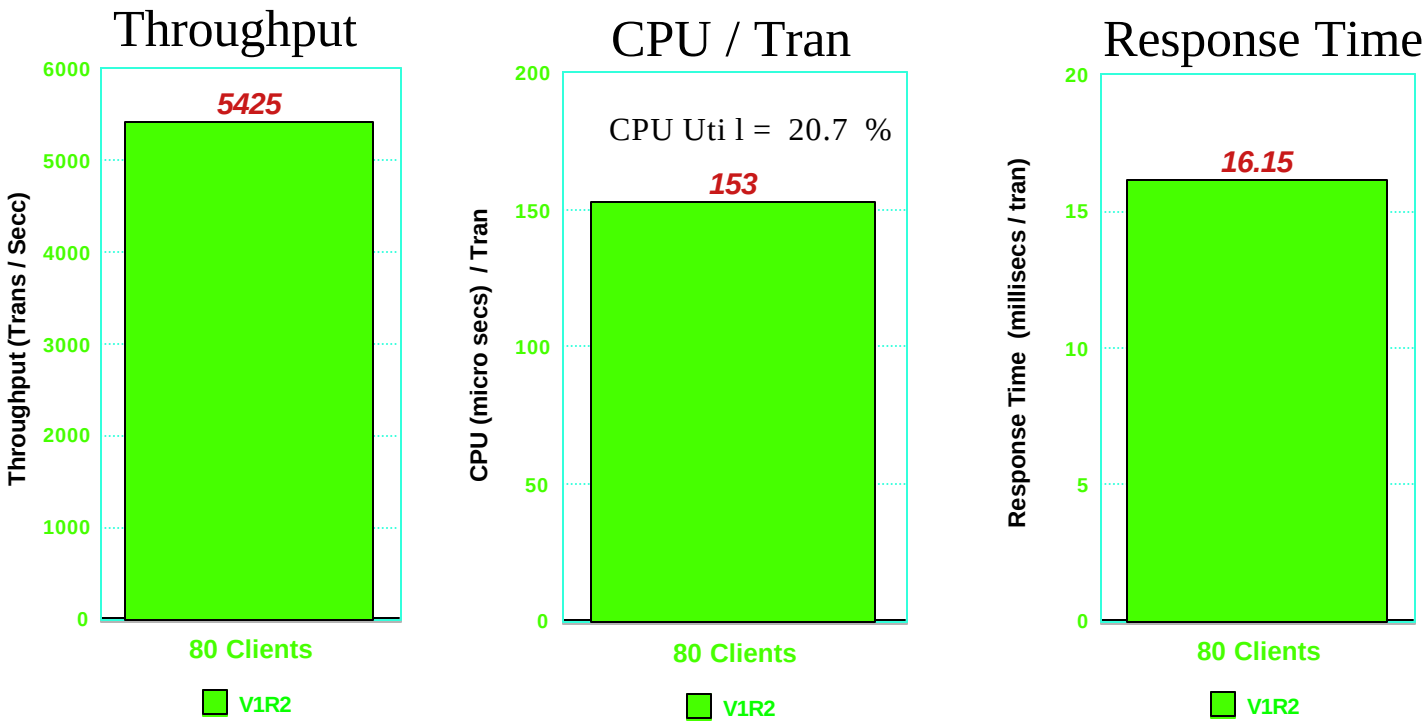
# of TN3270 Sessions	0	4000	8000	16000	32000	48000	64000
TCP/IP Below	0.548 M	0.6 M	0.616 M	0.648 M	0.696 M	0.792 M	0.824 M
TCP/IP Above	4.063 M	4.208 M	4.26 M	4.368 M	4.528 M	4.848 M	4.956 M
TCP/IP LSQA /SWA/**229/230** Below	0.200 M	0.212 M	0.228 M	0.276 M	0.276 M	0.296 M	0.296 M
TCP/IP LSQA /SWA/**229/230** Above	**11.5 M**	**28.8 M**	**41.5 M**	**67.3 M**	**118 M**	**169 M**	**220 M**
CSM Data Space	1.56 M	4 M	10.2 M	8.08 M	12.5 M	26.1 M	26.1 M
System CSA Below	1.14 M	1.14 M	1.15 M	1.15 M	1.15 M	1.15 M	1.15 M
System CSA Above	**43.6 M**	**56.5 M**	**69.3 M**	**89.2 M**	**141 M**	**197 M**	**252 M**
System SQA Below	0.756 M	0.836 M	0.836 M	0.836 M	0.836 M	0.836 M	0.836 M
System SQA Above	10.4 M	12.1 M	12.5 M	12.9 M	14 M	15 M	16.1 M
Total Below	2.65 M	2.79 M	2.83 M	2.91 M	2.96 M	3.07 M	3.106 M
Total Above	71.12 M	105.61M	138.7 M	181.85M	290.03M	411.95M	520.5M
Total	73.77 M	108.4M	141.53M	184.76M	293M	415.0 M	523.6M
Delta Per User Total (KB)		8.66 KB	8.47 KB	6.94 KB	6.85 KB	7.11 KB	7.03 KB

Delta Per User Total: 6.94 to 8.66 KB / user (4000 to 64000 TN3270 sess.)

Storage usage of TCP/IP Addr Space and MVS System Storage (SQA, CSA) during TN3270 echoes (4000 to 64000 users) when using CS/390 V1R2 .

z/OS V1R2 Comm. Server Perf. Summary

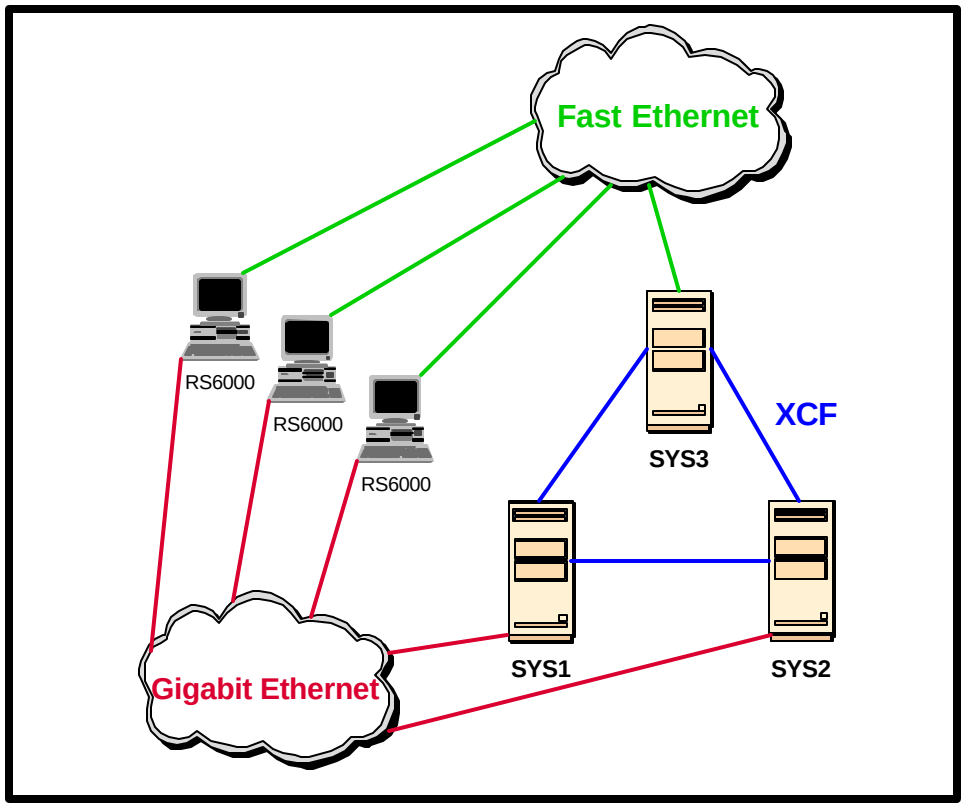
- Web Serving :



Tran Size (Avg): 73 bytes in / 7.6 KB out # clients = 80
File Sizes: 1 KB to 200 KB
Config: AIX WS (4)----GbE----Switch----OSA-Express/GbE----2064-108 (4 CPs)
Used FRCA (Fast Response Cache Accelerator), approx. 100% cache hits.

R10 Sysplex Distributor

Comparing Sysplex Distributor vs Fowarding Router Stack:



Clients: 3 RS6000's MTU: 1500 CS/390 Rel: V2R10
SYS3: Configured as a Sysplex Distributor or Fowarding Router Stack
9672-RX6 (G5), 2 CP's
Servers: SYS1 & SYS2 (9672-RX6 (G5), 2 CP's each)
Data Flow (In): RS6000's---FE---SYS3---XCF---SYS1 or SYS2
Data Flow (Out): SYS1 or SYS2---GbE---RS6000's

R10 Sysplex Distributor (TN3270)

TN3270 Traffic Test:

TN3270 Config:

60 sessions (20 sessions / RS6000)

Bytes In : 130

Bytes Out : 800

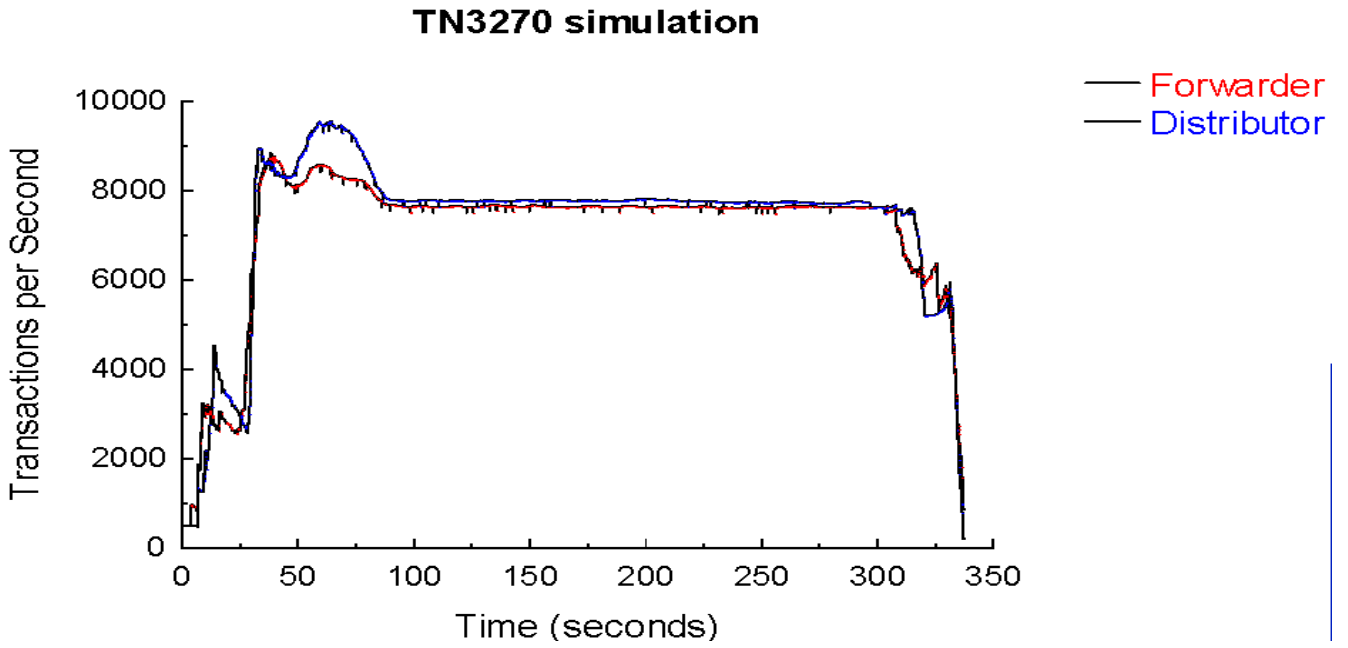
Performance Results:

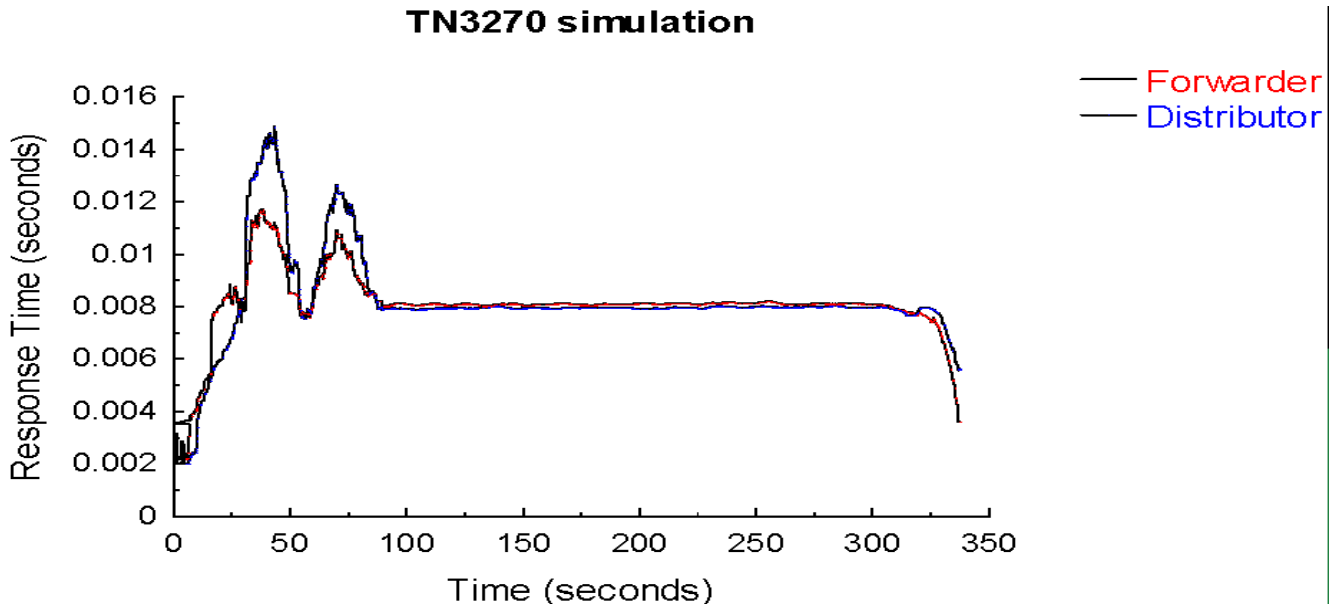
TPUT: 1.2 % less tput when SYS3 used as Sysplex Distributor (vs Forwarding Router Stack)

Response Time: 1.6 % less when SYS3 used as Sysplex Distributor (vs Forwarding Router Stack)

CPU/Tran: approx. the same

R10 Sysplex Distributor (TN3270)





R10 Sysplex Distributor (FTP)

FTP Traffic Test:

FTP Config:

18 sessions (6 sessions / RS6000)

Bytes In : 1

Bytes Out : 20 MB

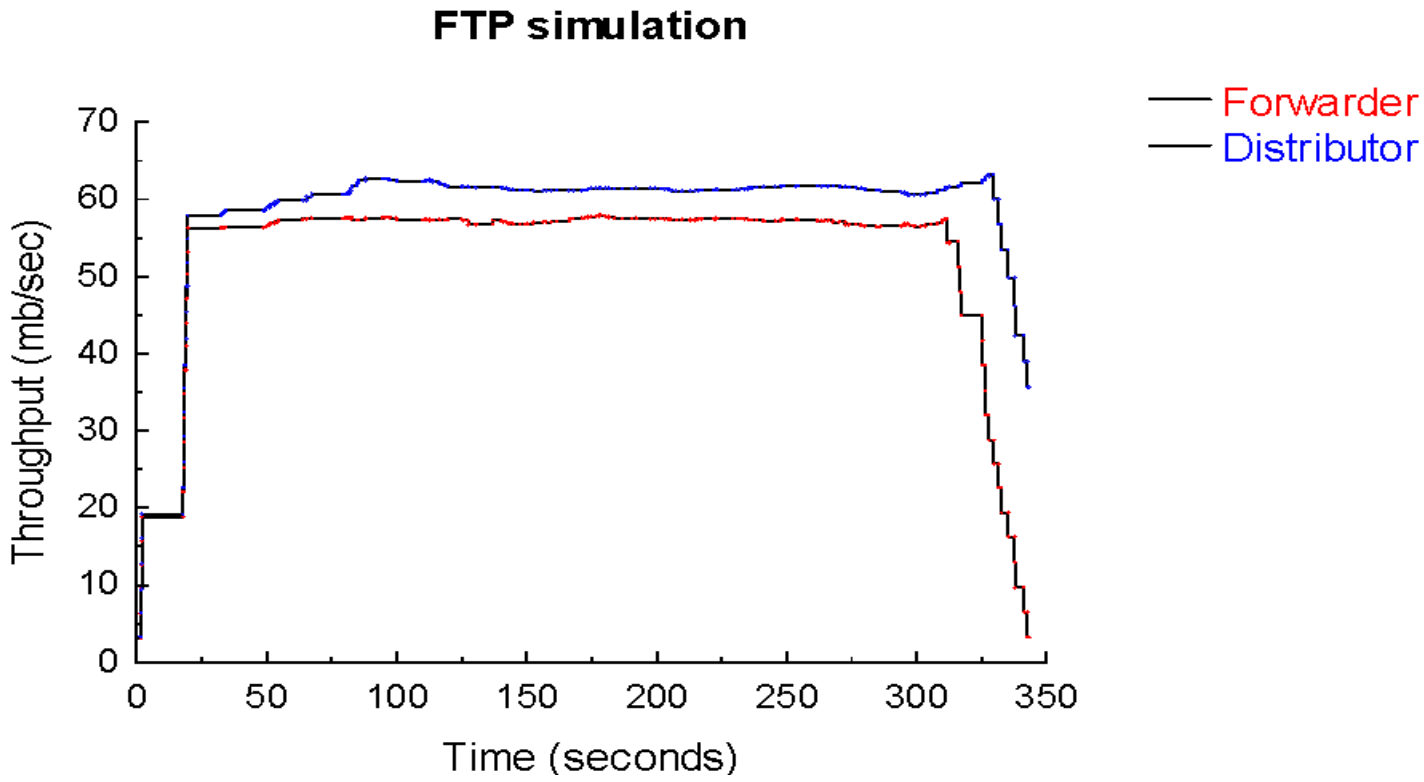
Performance Results:

TPUT: 8.4 % higher tput when SYS3 used as Sysplex Distributor (vs Forwarding Router Stack)

CPU : 10 % higher when SYS3 used as Sysplex Distributor (vs Forwarding Router Stack)

TPUT/CPU : 1.45 % less when SYS3 used as Sysplex Distributor (vs Forwarding Router Stack)

R10 Sysplex Distributor (FTP)



z/OS V1R2 Comm. Server Perf. Summary

- Summary:

z/OS V1R2 vs R10:

Workload	TPUT Ratio (+ is good)	CPU Ratio (- is good)	Response Time Ratio (- is good)
Netmarks Primitives (RR,CRR, STR)	+ 3 to + 6.2 % (Avg : + 4.7 %)	NA	- 5.5 to + 2.5 % (Avg : - 2.4 %)
FTP Server	SS: - 2.3 to + 10.8 % (Avg : + 3.75 %) MS: - 8.3 to + 12 % (Avg : + 0.08 %)	SS: - 1.1 to - 14.8 % (Avg : - 8.1 %) MS: - 3.1 to + 3.4 % (Avg : + 0.32 %)	NA
FTP Server (Claw Packing)	SS: + 31.8 to + 35.5 % (Avg : + 32.8 %) MS: + 54 to + 66.7 % (Avg : + 60.6 %)	SS: - 2.9 to - 13.2 % (Avg : - 8.2 %) MS: - 11 to - 24.1 % (Avg : - 18.5 %)	NA

Note: SS = Single Session, MS = Multiple Sessions

z/OS V1R2 Comm. Server Perf. Summary

- Summary (Con't):

z/OS V1R2 :

Workload	Throughput (Trans / Sec)	CPU / Tran (microseconds)	Response Time (milliseconds)
TN3270 (4000 to 64000 sessions)	399.1 to 5732.5	262 to 332	NA
Web Serving (80 clients using FRCA)	5425	153	16.15

z/OS V1R2 Comm. Server Perf. Summary

- Summary (Con't):

OS/390 V2R10:

Sysplex Distributor vs Forwarding Router Stack:

Workload	Throughput (Trans / Sec)	CPU / Tran	Response Time	TPUT / CPU
TN3270 (60 sessions)	- 1.2 %	Same	- 1.6 %	- 1.2 %
FTP (18 sessions)	+ 8.4 %	+ 10 %	NA	- 1.45 %