SNASw Performance

Overview

Cisco Systems performed a series of tests to determine the percentage of the CPU utilized on various Cisco router platforms deploying the SNASw feature. This data can help customers make a ballpark comparison between the processing capabilities of different router model types and a determination of how many transactions per second (tps) a particular router platform can support.

The SNASw performance information is divided into three separate categories. First, it provides an approximate benchmark for a new SNASw deployment. Graphs show the impact of data traffic on CPU utilization for a number of Cisco hardware platforms. Second, it shows the performance characteristics of running SNASw alone on the router versus running SNASw and DLSw+ combined. Finally, the data provides a relative performance comparison between SNASw and Cisco's previous APPN PSNA platform.

This performance paper does not compare performance results between SNASw and DLSw+. The decision to deploy SNASw, DLSw+, or a combination of SNASw and DLSw+ should be based on requirements, current environment, and needed functionality. A *DLSw+ TCP Performance* white paper comparing performance results on a wide variety of Cisco hardware platforms running DLSw+ is available at www.cisco.com/warp/public/cc/pd/ibsw/ibdlsw/tech/dstcp_wp.htm.

Note: Although processor utilization on most of the router platforms tested was driven to 70 percent router CPU utilization (and higher), it is recommended that networks deploying SNASw and DLSw+ utilize no more than 50 percent of the router CPU. This recommendation is especially important if availability, redundancy, and the ability to scale to meet future growth requirements is an absolute necessity.

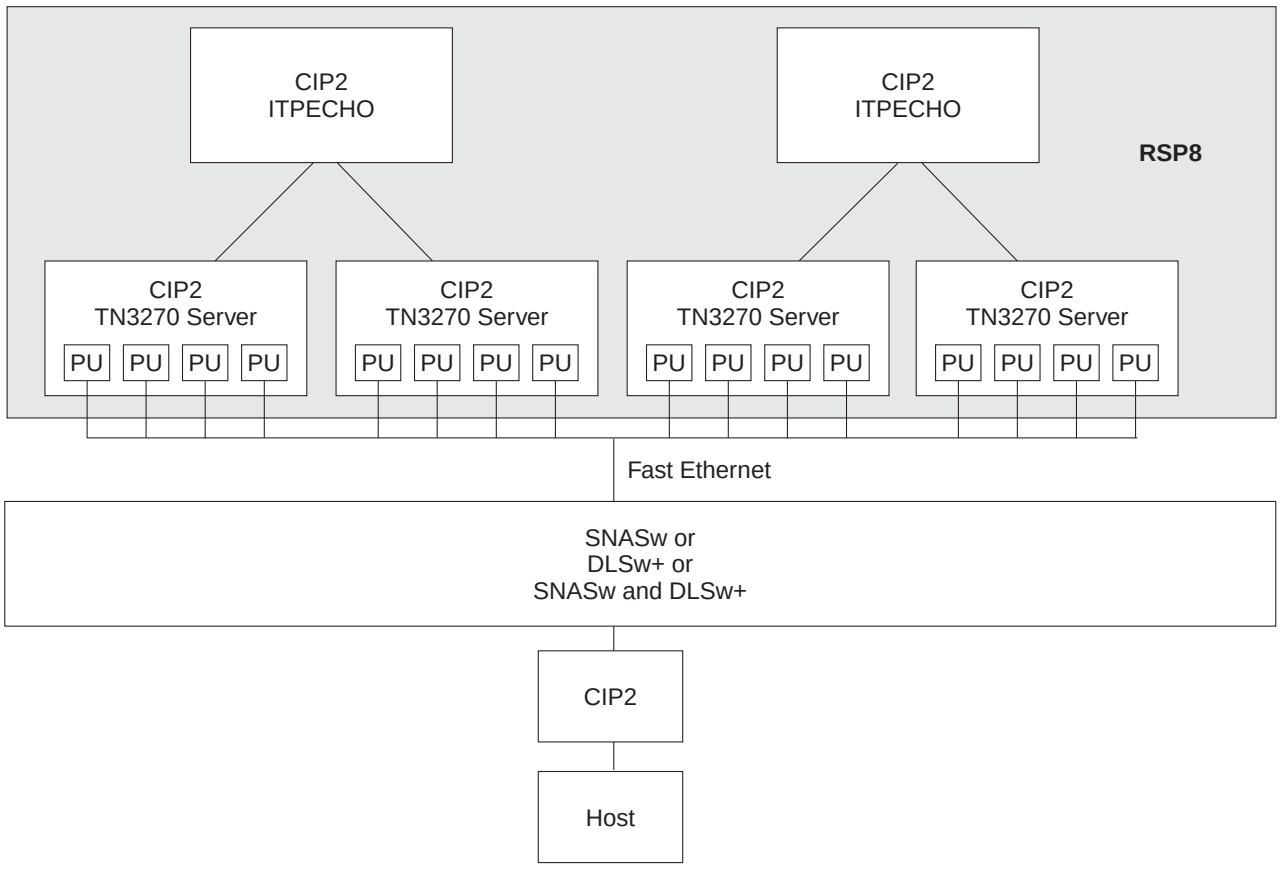
For more information about designing SNASw networks, consult the *SNASw Design and Implementation Guide* at www.cisco.com/warp/public/cc/pd/ibsw/snasw/tech/snasw_rg.pdf. For more information about designing DLSw+ networks, consult the *DLSw+ Design and Implementation Guide*.

The Test Environment

In all performance test cases the ITPECHO test tool was used to generate SNA traffic to an echo application on the host mainframe (ITPECHO is an internal Cisco test tool that runs on a special microcode version for the CIP. Two CIP2 routers were used to run the ITPECHO application, each directed to two Cisco TN3270 Servers for the purpose of generating and directing traffic to SNASw. All six CIPs resided on one Cisco 7513 router.

The traffic generation setup is summarized in Figure F-1.

Figure F-1 Traffic Generation Setup



For each SNA LU created, 100-byte frames were sent to the host every one second with a 1000-byte response frame returned from the host (this transaction profile simulated typical SNA interactive data traffic).

A script was used to start the instances of ITPECHO and record the average CPU usage for a specific transaction per second (tps) rate over five-minute intervals. The script was then restarted using the ITPECHO tool with more LUs (Cisco testing has shown that the load on router CPU is dependent only on the total number of sessions—that is, the CPU load for 100 PUs with one LU per PU and for one PU with 100 LUs per PU is the same), and statistics were recorded for each run. The test procedure was repeated until the CPU on each SNASw router tested was fully utilized (CPU utilization at 100 percent).

Statistics were compiled and recorded, and five-second CPU utilization statistics were recorded in 30-second intervals while data traffic was running. A Cisco IOS show snasw statistics command was executed before stopping data traffic. The data frame rate was computed in two ways. The data frames sent and received by each PU were recorded from output of the show snasw link xid command before the data traffic was started. Data traffic was terminated after five minutes and the output from the show snasw link xid command was recorded again (Cisco internal testing has shown that five minutes is sufficient time to compute an accurate average).

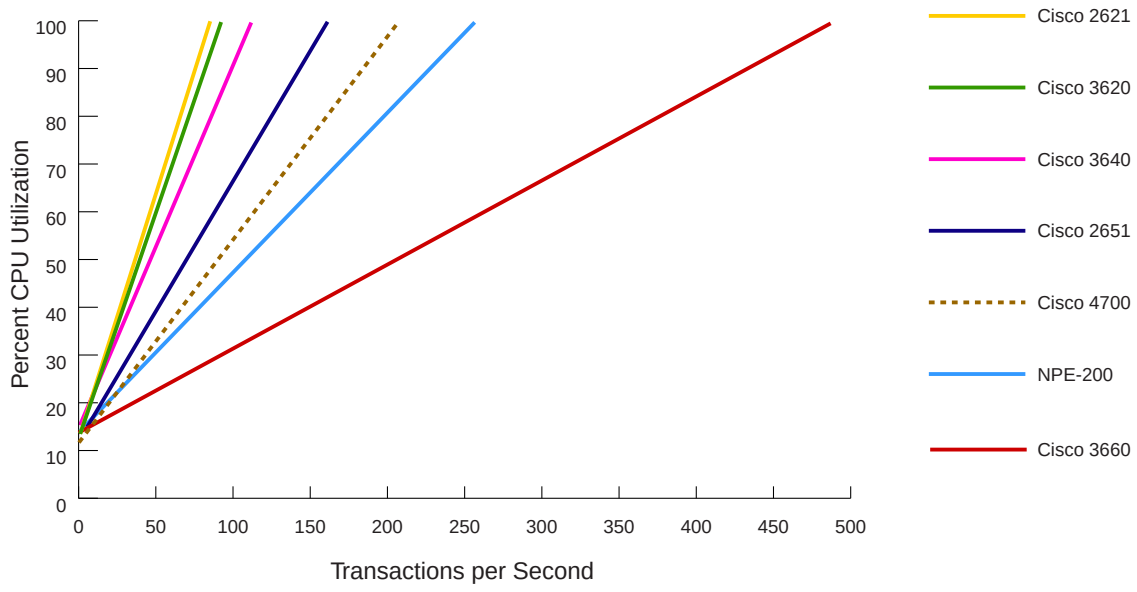
Results

The tests measured the percentage of the CPU utilized on various Cisco routers as a function of transaction rate (number of transactions per second) for SNASw running standalone, as well as SNASw and DLSw+ running concurrently on the same router. In some instances, a variety of modes were examined, including HPR/IP and ISR. The results presented in this paper can assist in making ballpark comparisons between performance characteristics of different Cisco router models and in estimating how many transactions per second a particular Cisco router platform can support.

Branch Router HPR/IP Performance

In many customer environments, SNASw is typically deployed in Cisco routers installed in remote branch offices. This is because the SNASw EE feature can enable the transport of SNA traffic over IP/UDP all the way from the remote branch router into the IBM S/390 or zSeries enterprise mainframe server. Figure F-2 compares the number of transactions per second processed with the corresponding router CPU utilization for the Cisco 2621, 2651, 3620, 3640, 3660, NPE-200, and 4700 hardware platforms in remote branch offices running SNASw EE (HPR/IP).

Figure F-2 Branch Routers Running HPR/IP

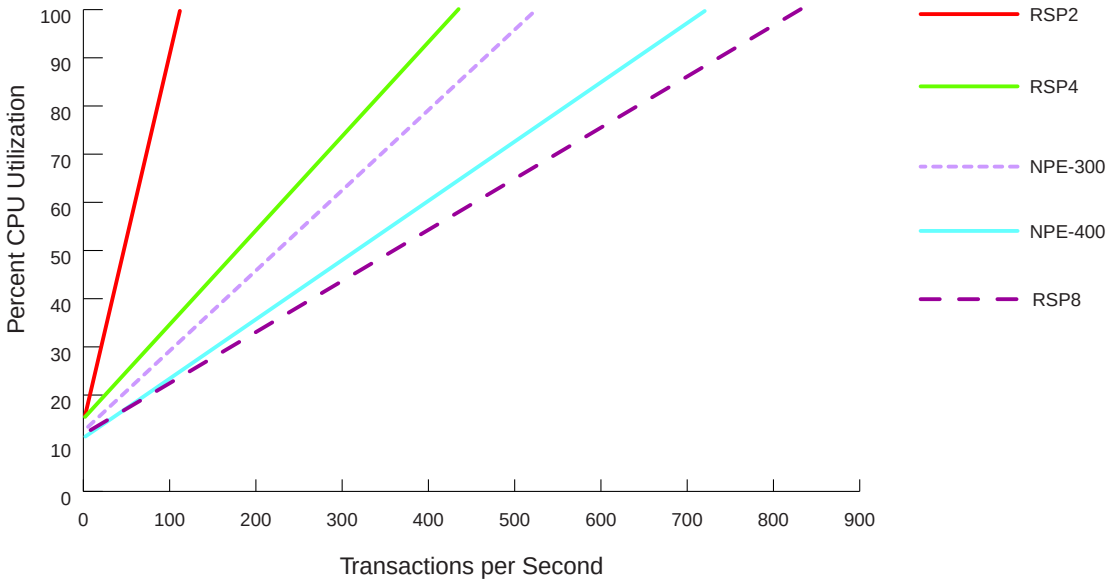


Note: The figures in this document represent a linear fit of the average CPU data points.

Data Center Routers Running HPR/IP with DLSw+

Customer enterprises already running DLSw+ for SNA transport over an IP WAN network might opt not to deploy SNASw EE out to remote branches because the DLSw+ network has been in place and stable for a long time. Many of these customers, however, add SNASw to central site routers terminating existing DLSw+ peer connections from remote branch DLSw+ routers. The BX capability of SNASw provides the necessary SNA routing for downstream SNA devices, while the SNASw EE feature transports SNA traffic natively into upstream IBM EE-enabled enterprise servers over IP Layer 3 switches such as the Catalyst 6500 Series. Figure F-3 compares the number of transactions per second processed with the corresponding router CPU utilization for the Cisco RSP2, RSP4, RSP8, NPE-200, and NPE-400 hardware platforms in the data center running SNASw EE and DLSw+ concurrently in the same router.

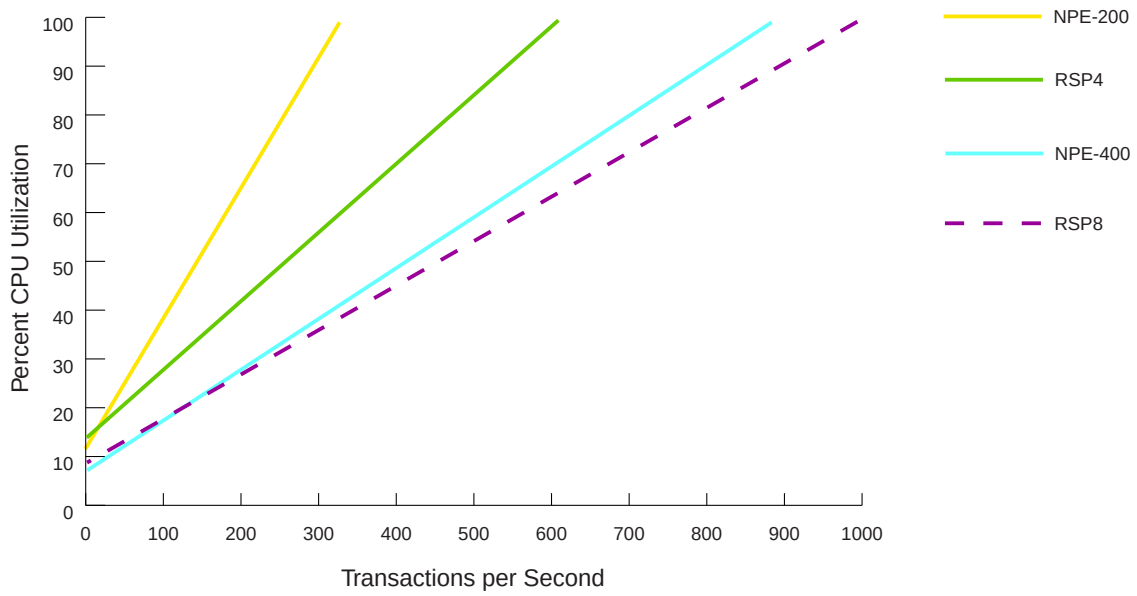
Figure F-3 Data Center Routers Running HPR/IP with DLSw+



Data Center Routers Running HPR/IP without DLSw+

SNASw can also be deployed in central site data center routers separate from the routers supporting existing downstream DLSw+ SNA transport functions. Figure F-4 compares the number of transactions per second processed with the corresponding router CPU utilization for the Cisco RSP4, RSP8, NPE-200, and NPE-400 hardware platforms in the data center running SNASw EE (HPR/IP) without DLSw+.

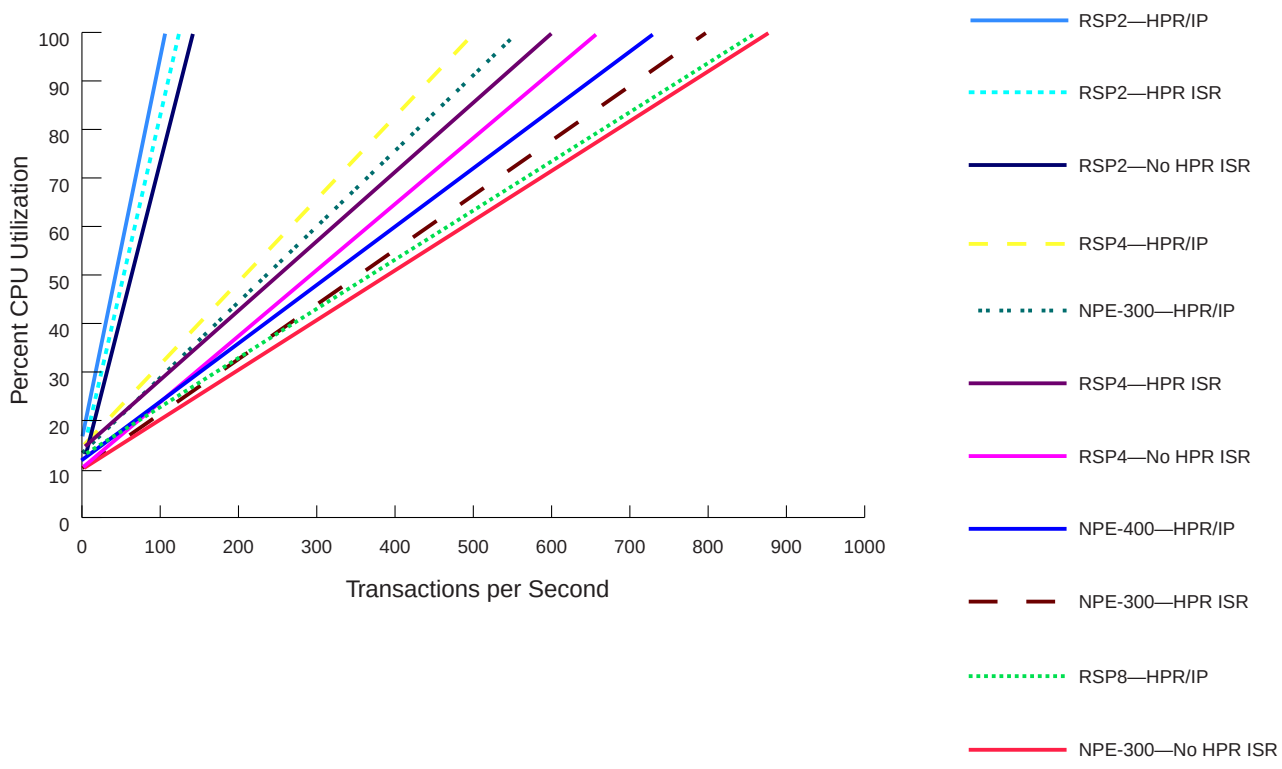
Figure F-4 Data Center Routers Running HPR/IP without DLSw+



Comparison of SNASw Modes for Data Center Routers Running with DLSw+

Figure F-5 compares the number of transactions per second processed with the corresponding router CPU utilization running the various supported SNASw modes of operation (EE HPR/IP, HPR over LLC, and ISR) for Cisco RSP2, RSP4, RSP8, NPE-300, and NPE-400 hardware platforms.

Figure F-5 Comparison of SNASw Modes for Data Center Routers Running with DLSw+



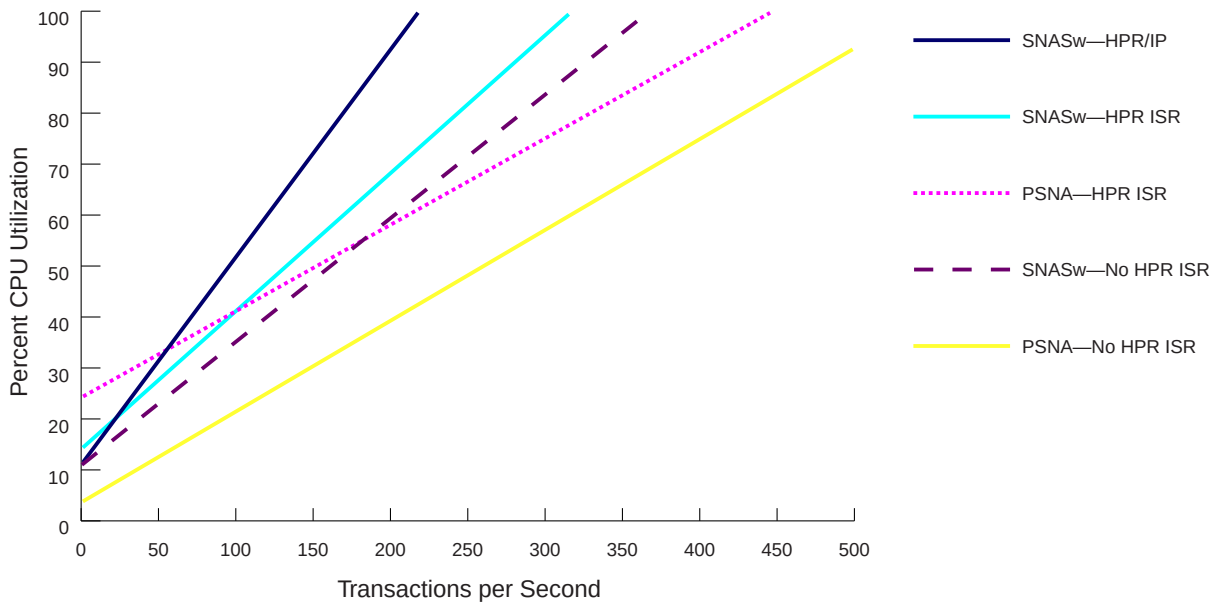
Note: The NPE-400 and RSP8 were tested only with SNASw enabled for EE (HPR/IP) and DLSw+.

Comparison of SNASw and PSNA for Branch Router

It is important for customers migrating to SNASw from Cisco's previous APPN NN feature in the Cisco IOS Software (PSNA) to understand the performance differences between the two platforms. Figure F-6 compares the number of transactions per second processed with the corresponding router CPU utilization for the various modes of APPN PSNA and SNASw operation on a representative Cisco remote branch router platform (the Cisco 4700 Series).

Note: No performance results are available for EE with APPN PSNA because the EE feature is not supported on this platform.

Figure F-6 Comparison of SNASw and PSNA in a Cisco 4700 Series Branch Router

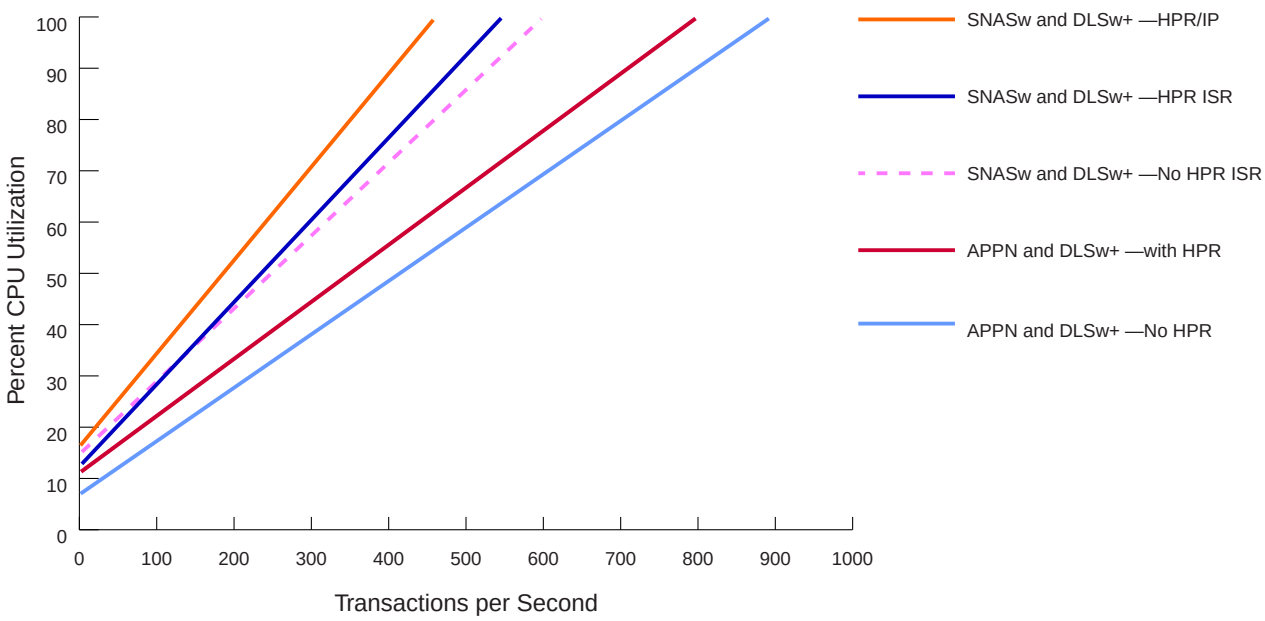


Comparison of SNASw and PSNA for RSP4

As in the previous test, it is important for customers to understand the performance differences between APPN PSNA and SNASw running in central site data center environments. Figure F-7 compares the number of transactions per second processed with the corresponding router CPU utilization for the various modes of APPN PSNA and SNASw operation on a Cisco RSP4 hardware platform also running DLSw+.

Note: Again, no performance results are available for EE with APPN PSNA because the EE feature is not supported on this platform.

Figure F-7 Comparison of SNASw and PSNA on the RSP4



Version Information

All routers tested ran the SNASw feature set in Cisco IOS Release 12.1(5), which was the latest SNASw release available at time of testing.