

How different are OS/390 and z/OS?

In transitioning publications or literature (circa Y2K timeframe) when zArchitecture was introduced, you possibly will see the OS390 and z/OS referenced together. What is common in the foundation of the z/OS Architecture is its heritage from S390. The entire instruction set used today in Z is the groundwork from past OS versions. The change to Z from OS390 provided the opportunity to add new functionality from both hardware and software sides. Although, basically the evolution to zArchitecture (z/OS) was to enhance two key areas of growth: addressability and integrity.

In early 4th Q of 2000 IBM introduced the zSeries 900 Server which incorporated a new design for high performance data and transaction serving. This is when the On-Demand era began. In order to complete the infrastructure supporting this industry theme IBM implemented z/Architecture providing 64-bit real storage addressability (from 31-bit = $2^{31} = 2\text{GB}$) to achieve unprecedented scale in memory addressing. Note – that this support for 64-bit was retro'd to OS/390 R10 (last S390 Release) thus began the wane of old to new. The z/OS 64-bit storage support was available on the new (at the time only) z900 hardware machines. The new addressing now provides virtual storage capability of 2^{64} equaling 16 Exabytes. That's 8 Billion times more virtual storage than offered under 31-bit. IBM also introduced new instructions to exploit the 64-bit address scheme. This provided applications, middleware and subsystems (i.e. DB2) new vertical growth allowing more users and more concurrent transactions. Note – 64-bit apps can coexist with 31-bit apps, therefore sophisticated applications or middleware can choose to design their support to combine the strength of both horizontal and vertical growth capabilities. Thus this supports the foundation (backward compatibility) of instruction set commonality between os390 and z/OS.

Along with the new z Hardware another highlight was HiperSockets. I briefly covered this during the Networking Topic. Again, they provide very fast TCP/IP communications between applications running in different Logical Partitions (LPARs) on a z8xx, z9xx or System z9 mainframe. The communication is through the system memory of the processor (backplane). The virtual servers (LPARs) are connected to form a "virtual LAN". HiperSockets uses internal Queued Input/Output (iQDIO) at memory speeds to pass traffic between the virtual servers. Hipersockets is a microcode function of the z processors and supports up to sixteen independent "virtual" nets, which operate as TCP/IP networks within a z machine. There is no need to transverse an external network to communicate between independent Logical Partitions or servers. As an example, this feature provides Linux partitions and z/OS applications the ability to collaborate and communicate at cross memory speed as if they ran as a single image.

The likelihood of a single website providing differences between S390 and zArchitecture may not exist (anymore). One would probably need to go into each SW brand and HW component to research specifics on the enhancement and implementation. Although, basically the transition between 31 to 64 addressing was the keynote change in architectures.