The IBM z13 was built to support CAMSS workloads where the I/O enhancements reduce transactional latency mitigating increases to transaction response times that might be introduced by adding cloud sourced data to the workloads. - These performance improvements also improve the scalability of z/OS middleware (such as DB2) to meet the demands of mobile applications. - The increase in the volume of I/O drives the requirement for further improvements to the already industry-leading quality of service (QoS) capabilities of 2 Systems.

- New葬bo Enhancements affect processing in the following ways:
  - Improve the Fibre Channel links to reduce error rates.
  - Extend the zI/O workload manager into the SAN fabric to manage the end-to-end work according to client policy.
  - Provide reduced cost for the physical infrastructure with enhanced virtualization to allow sharing more of the enterprise I/O traffic over shared ISLs.
  - Provided improved availability with additional flexibility and scale to the I/O configuration.

**New value to I/O infrastructure**

- **FIBCON Express16S channel with the Prologue:** The IBM z13 was built for reducing latency mitigating increases to transactional latency and up to 32% reduction in elapsed time for I/O bound batch jobs.

- **Forward Error Correction (FEC) with storage capabilities to the Fibre Channel link protocol:** With higher speeds, over longer distances, with reduced power and higher throughput, while retaining the same reliability and robustness that FICON has traditionally been known for.

- **Enhancements to extend the z/OS workload manager into the SAN fabric to manage the end-to-end work according to client policy:** The FICON Express16S channel provides improved availability with additional flexibility and scale to the I/O configuration. A fourth subchannel set for each logical channel subsystem (LCCS) is provided to eliminate single points of failure for storage after a disk failure by facilitating the operation of IBM Data Storage Device (DS8870) multi-target Metro Mirror storage replication with IBM Geographically Dispersed Parallel Sysplex™ (IBM GDPS®) and IBM Tivoli Storage Productivity Center for Replication HyperSwap.

**IBM z13 Supports**

- The new I/O rates and bandwidth of the FICON Express16S channel provide a significant improvement in I/O rates over the FICON Express8S channel. Figure on left shows the recent history of the z Systems FICON Express channels and their growing capabilities in terms of increasing I/O rates and link bandwidth. It is important to note two facts from these figures:
  - Second, the growth in link bandwidth also comes mostly with 2.5 µsec improvement and link bandwidth trends will continue into the future.

**FIBCON Express16S**

- The IBM z13 was built for delivering substantial value to the I/O infrastructure:
  - Fibre Connection (FICON) Dynamic Routing is a new feature that enables exploitation of SAN dynamic routing policies in the fabric to lower cost and improve performance for supporting I/O devices.
  - Mainframe SAN Fabric Priority, with exploiting storage products, extends the IBM z/OS Work Load Manager (WLM) to the SAN infrastructure providing improved resilience and autonomic capabilities while enhancing the value of FICON Dynamic Routing.
  - FICON Express16S with the DS8870 can provide substantially improved DB2 transactional latency and up to 32% reduction in elapsed time for I/O bound batch jobs.
  - Forward Error Correction (FEC) with storage capabilities to the Fibre Channel link protocol can operate at higher speeds, over longer distances, with reduced power and higher throughput, while retaining the same reliability and robustness that FICON has traditionally been known for.
  - Enhanced I/O rates and bandwidth of the FICON Express16S channel provide a significant improvement in I/O rates over the FICON Express8S channel.

**IBM System z I/O Exerciser (ESAIO)**

- ESAIO simplifies the chore of exercising the I/O connections in the I/O configuration before starting z/OS and running production work. This tool is intended to help identify possible cabling or definition errors by validating that all the paths defined to each device actually connect to the same physical device.

**FEC allows FICON channels to operate at higher speeds, over longer distances, with reduced power and higher throughput, while retaining the same reliability and robustness that FICON has traditionally been known for.**

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**Relative I/O latency is improved with the z13, as shown in this example:**
- Below 350 Mbps z13 FICON Express8S 8Gb HBA response time is 17% lower (better) than zEC12 FICON Express8S 8Gb HBA.
- Below 350 Mbps z13 FICON Express16S 16Gb HBA response time is 32% lower (better) than zEC12 FICON Express8S 8Gb HBA.

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