IBM z Integrated Information Processor (zIIP)

Workload Growth

Requirements for new applications, workload growth, digital transformation and the transition to hybrid cloud services are driving unprecedented needs for additional compute capacity. Yet IT management is challenged by budget constraints and the ability to cost effectively scale infrastructure to meet new demand.

The world's most mission critical applications run on IBM Z®, because of the need for extreme performance, ultimate availability, highest security and seamless scalability. Given budget challenges, many clients manage their workload activity to keep software MLC charges predictable and manageable. This behavior may restrict new applications or workloads from being deployed on the best platform … IBM Z.

The zIIP solution

In 2005, IBM introduced the IBM z Integrated Information Processor, a special purpose processor, specifically designed to make it very price competitive to run new applications on IBM Z minimizing MSU usage or incremental MLC charges. IBM clients can now obtain all the benefits of running new applications on the IBM Z platform with negligible impact to their IBM software bill.

New functions make the IBM zIIP even better

The use cases for IBM zIIPs have expanded dramatically beyond traditional Java and Db2 exploitation. Furthermore, the value of zIIPs have improved due to the investments we've made with on-chip acceleration that will permeate through the other scenarios.

IBM introduced a new on-chip accelerator for the IBM z15™ for zEnterprise Data Compression. Achieve significant data compression for storage savings and faster elapsed and data transfer times for new applications that you run on your IBM zIIPs.

IBM zIIPs on the IBM z15 and IBM z14® take advantage of the integrated pervasive encryption chip to make your new applications much more easily securable than what you can achieve on distributed platforms or public clouds.

Gateway to Hybrid Cloud

IBM zIIP engines are used to support IBM z/OS® Container Extensions (zCX), a new z/OS 2.4 feature that enables clients to deploy Linux® applications as Docker containers on z/OS as part of a z/OS workload. This maintains operational control of the Linux environment within z/OS, brings z/OS qualities of service to the application deployment, and does not require the provisioning of separate LPARs or system images.

zCX is an enabler to modernize your existing z/OS applications for hybrid cloud, because now these applications can call native Linux microservices from a Docker container on Z with minimal latency to deliver new capabilities and applications to your clients and users.

You can also use zIIPs with IBM z/OS Connect to call external APIs from your mainframe applications and expose your mainframe assets as easily consumable RESTful APIs to drive hybrid cloud applications in your enterprise.

Migrating certain z/OS applications to hybrid cloud in many environments can be started quickly using IBM zIIP processors, z/OS Connect and IBM z/OS Container Extensions for faster speed to value.

System Recovery Boost Enablement

Having IBM zIIP engines enable you to further leverage the IBM System Recovery Boost function on an IBM z15. System Recovery Boost is a feature on the IBM z15 system and the z/OS operating system that allows you to significantly shorten the time to shut down and restart a system for planned and unplanned outages, in order to reduce the impact and cost of downtime.

While subcapacity machines can use "speed boost" to accelerate the shutdown, restart and workload "catch up" processing, full capacity machines rely on zIIP engines to accelerate these functions. Using additional zIIPs will accelerate the shutdown and restart times of your IBM z15 and provide more capacity for 'catch up' workload processing. Many clients with subcapacity z15 systems can also see large benefits from adding zIIPs to their configuration as this incremental capacity will be available at shutdown, restart and post recovery processing in addition to the GP engines that have throttled up to full speed.

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Application Use Cases for zIIP

Java and XML
Application programs written in Java run terrific on IBM z/OS and can use an IBM zIIP to seize advantage of extensive Java™ compression capabilities as well as pause-less garbage collection to dramatically reduce storage and networking costs. There are no anticipated modifications to the Java application(s).

Many clients develop Java applications at the core of their mission critical workload. This can be achieved through IBM Websphere Application Server for z/OS for JEE deployment, or for Java applications in CICS or IMS to develop and deliver cost effective, modern applications via zIIPs.

For clients who desire cost effective XML parsing services on z/OS, z/OS XML System Services can exploit the zIIP for eligible XML workloads.

IBM Db2® for z/OS
Beginning with Db2 for z/OS V8, Db2 for z/OS exploits the zIIP capability for portions of eligible data serving, pure XML, and utility workloads. The table below helps to describe IBM Db2 for z/OS workload that is eligible to be offloaded to a zIIP.

IBM Watson® Machine Learning for z/OS
IBM Watson Machine Learning for z/OS brings AI to your transactional applications on IBM Z using zIIP engines on your IBM ZIt offers an end-to-end machine learning platform that operationalizes predictive models while also benefiting from core IBM Z qualities of service. MLeap and SparkML training models in Watson Machine Learning for z/OS run on zIIP engines.

Apache Spark for IBM z/OS
Clients can deploy Apache Spark on IBM zIIPs to run complex analytics and machine learning on very large, complex data sets with minimal impact to MSUs and MLC costs.

IBM Communications Server
z/OS Communications Server exploits the zIIP for portions of internet protocol security (IPSec) network encryption and decryption. z/OS Communications Server also exploits zIIP for select HiperSockets™ large message traffic. z/OS Global Mirror enables DFSMS™ System Data Mover processing for zIIP. And portions of z/OS CIM Server processing are eligible for zIIP, in z/OS V1.11 or later.

IBM Monitoring Solutions
IBM OMEGAMON® zIIP eligibility includes but is not limited to IBM OMEGAMON XE on z/OS for direct access storage device (DASD) scanning, OMEGAMON XE for Db2 Performance Expert (and Db2 Performance Monitor) for normalizing Db2 for z/OS raw instrumentation data. OMEGAMON CICS® SLA Report Builder.

Clients who have IBM RMF™ V2R1 and above and who also have at least one zIIP processor online in the partition where RMF Monitor III (RMFGAT) is running are able to run a portion of Monitor III work on zIIP engines.

IBM Z Common Data Provider uses zIIPs to deliver the infrastructure for accessing data from z/OS applications and operations and streaming it to an analytics platform in a consumable format.

ISV software
Many ISV software packages run on zIIPs. Check with your software supplier for eligibility.

Business Intelligence Reporting
IBM Global Business Services can enable the scalable architecture for financial reporting (SAFR) enterprise business intelligence reporting solution on IBM zIIP engines to deliver cost effective management reports using current operational data from your IBM Z Systems of Record.

zIIP candidate analysis
The PROJECTCPU parameter in z/OS can be used to project zIIP consumption using RMF and SMF data.

Summary
IBM zIIP capabilities represent an innovative and cost- effective method to address application deployment using cloud native models, improved resilience through SRB, and optimized efficiency for key infrastructure and technologies like AI, tooling etc.

Z Integrated Information Processor Requirements

The minimum HW requirements are:
- IBM z15 with z15 Feature Code 0125 or 0126
- IBM z14 with z14 Feature Code 1936
- IBM z13® with z13 Feature Code 0125 or 0126

The minimum software requirements are:
- z/OS V1R6 (5694-A01), or later, or z/OS V2R1 (5650-ZOS), or later
- z/OS V2R4 (5650-ZOS) for Container Extensions
- Db2 V8 (5675-DB2) with zIIP enabling APARs installed, or later
- Additional software requirements may apply

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