



Strategies for IBM zIIP Processors

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technical paper

IBM Introduces the zIIP Engine

In 2006, IBM introduced a new specialty engine for their z9 mainframes called the IBM System z9 Integrated Information Processor (IBM zIIP). Like the specialty engines before it, the zIIP is in place to accept a special type of workload, moving that workload from the general purpose processors. In this way, the zIIP is able to free-up general computing capacity and lower the overall total cost of computing. IBM has already been able to exploit the zIIP for portions of DB2 workload. They have stated that they have plans and/or efforts underway to implement zIIP for business intelligence (BI), ERP and CRM, and select network encryption workloads.

The zIIP really isn't much different from regular central processors (CP). It runs a full instruction set. The zIIP exploitation challenge occurs on the software side. By design, zIIP processors can only accept enclave SRB (System Request Block) workload. Since most products and applications to date do not use the enclave SRB approach, zIIP exploitation usually necessitates potentially sizable code modification and rewrite.

Economic Implications

There is very different economics related to the zIIP. From a hardware perspective, they are priced significantly lower than the z/OS CP engines. From a configuration perspective, the one limitation is the number of zIIPs per mainframe cannot surpass the number of general-purpose processors. From a software licensing perspective, zIIP computing power does not count as MIPS. This means that the processing done on the zIIP is not included in the MIPS charges that the customer traditionally pays for when using mainframe CPU.

A direct effect of zIIP exploitation is that the hardware cost/MIP is reduced. Since the zIIP processor is less expensive than a CP processor, MIPS running on the zIIP will be less expensive than MIPS running on a CP [all other things being equal]. Since customers incur no software related costs to invoke zIIP processing, the case can be made that the software cost/MIP is as much as half that of non-zIIP enabled code (note: systems can be configured with up to the same number of zIIPs as base processors, in effect doubling the available MIPS available at a given software MIP level).

Workload Processing vs. Pricing

A side effect of zIIP exploitation is that base CP processor capacity can be freed up as CP workload shifts to the zIIP specialty processor. This can result in deferral of processor upgrades. An added kicker when deferring hardware upgrades is that software upgrade-related charges can be deferred as well. Consider that “[f]or four years in a row, attendees at the annual Gartner Data Center conference said that third-party software costs were the No. 1 inhibitor to mainframe growth. Since vendors, like CA Inc. and BMC Software Inc., have historically priced software based on the MIPS of the machine, shops that want to upgrade their mainframe tend to face steep software fee increases, even if they don't end up using all of the available hardware capacity.” (source: DataCenter.com - Data Center News Article: IBM System z9 Business Class mainframe revisited, May 2007).

The net effect of these pricing dynamics is that implementation and exploitation of zIIPs offer customers the potential of significantly lowering their overall cost of computing.

NEON Enterprise Software zIIP Direction and Initiatives

NEON Enterprise Software is committed to developing technology to utilize and exploit IBM's zIIP special purpose processor. All of the Eclipse Reorganization Utilities (The Eclipse utilities include iUnload, iLoad, iBuild, iCheck, iSurvey, and iCopy) are included in our plans, as well as our TITAN Audit products. Our plans may eventually encompass other NEON Enterprise Software product lines as well.

Development efforts for the Eclipse Reorganization Utilities are underway and have been given priority with the initial appearance of functionality targeted for Version 5.1 which is due out later this year (2007). With this release, full zIIP exploitation (i.e., 97 percent) will be in place for our iCheck pointer checker, iSurvey, and iBuild index builder, along with 50 percent exploitation for our iUnload product. We thereafter plan to roll out additional exploitation within the following releases of Eclipse including V5.2 targeted 3-6 months after V5.1 (2008).

We believe that from a technical perspective and due to the flexible design of our code, NEON Enterprise Software is uniquely positioned to be able to offer broad zIIP coverage across our set of reorganization and image copy (iCopy) utilities. Our developers assess that it is highly unlikely that our major competitors (BMC, CA, or IBM) will be able to follow suit with their IMS utilities due to various technical issues and hurdles.

Estimating the Value

Depending on processor configuration, system setup, and workload mix, it is possible that our Eclipse Reorganization Utilities could offload a significant portion of a customer's current IMS utility workload. It is possible that a customer could experience capacity gains of more than 90 percent of their IMS utility footprint.

Cost Justification

1. Calculate the value of CPU savings of zIIP exploitation.
 - a. Calculate the current cost of IMS utility workload.
 - Measure aggregate IMS Utility CPU units (e.g, CPU seconds)
 - Multiply by the cost per unit (e.g, *CPU seconds X the cost per second*)Label this result **(A) Total cost of IMS utility workload.**
 - b. Calculate the zIIP coverage of the NEON Enterprise Software Eclipse utilities
 - Benchmark zIIP exploitation by the Eclipse Utilities
 - Determine expected **(B) zIIP coverage percent** (e.g, 95 percent).
 - c. Estimate the relative cost savings of zIIP over base CP.

Calculate **(C) percent savings related to zIIP** (i.e., 1 minus (*cost of zIIP CPU unit / cost of CP CPU unit*))

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- d. Determine CPU savings potential.

$$\begin{aligned} & \text{(A) Total cost of IMS utility workload} \\ & \times \text{(B) zIIP coverage percent} \\ & \times \text{(C) percent savings related to zIIP} \\ & = \text{(D) NEON Enterprise Software savings potential.} \end{aligned}$$

- 2. Ascertain the impact that restored capacity might have in terms of deferred upgrades.
 - a. Contact the capacity planning group to assess if offloading of the IMS utility footprint would have an effect resulting in an upgrade deferral. Savings from this deferral can be measured using the time-value-of-money (i.e., cost-of-capital internal interest rate).
 - b. Consider the deferral value, if any, related to deferred software upgrade fees and deferred incremental licensing fees.

We hope this provides some perspective on the value proposition related to NEON Enterprise Software initiatives with enabling zIIP exploitation within our product set. Please contact NEON Enterprise Software if you have any questions or would like to discuss this topic further.

About NEON Enterprise Software

NEON Enterprise Software is the technology leader in enterprise data availability software and services. In a world where every second counts, our tools maximize database performance and availability and minimize business risk. Founded in 1995, NEON Enterprise Software is headquartered in Sugar Land, Texas and serves customers worldwide with its dedicated team of industry experts.

For more information, visit www.neonesoft.com or call 281.491.6366 or 888.338.6366.

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