White Paper

The Value of IBM zEnterprise for Deploying Heterogeneous Private Clouds
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Introduction

This paper identifies the value proposition created by implementing IBM zEnterprise as an integrated, heterogeneous, and virtualized platform supporting Infrastructure as a Service (IaaS) in cloud computing deployments.

The paper begins by expanding the definition of the private cloud and comparing the concepts of homogenous and heterogeneous clouds. Then we further develop the concept of fit-for-purpose workload deployment and the cost proposition for deployment in a private cloud. We utilize a defined workload metric to determine the impact of zEnterprise on the Total Cost of Acquisition (TCA) and the Total Cost of Ownership (TCO).

Having introduced the zEnterprise value proposition, we will use data from IBM studies, performed over a three-year period, to demonstrate the significant cost savings of a zEnterprise heterogeneous private cloud deployment, compared to deploying a public cloud. We further illustrate how these savings apply across applications in the IaaS structure, and influence the TCA/TCO computations.

Issue Definition

The concept of the private cloud was met with skepticism when it was first introduced. In 2009, John Foley wrote in Information Week, “[t]he drawback of private clouds is that IT departments still have to buy, build, and manage them. The original premises of cloud computing — think Salesforce.com — included lower up-front capital costs and less hands-on management by IT staffers.”

“In other words,” CNET news reported, “a 'private cloud' lacks the economic model that makes cloud computing such an intriguing concept in the first place.”

As customer exposure increased, IBM identified additional customer requirements. This led to studies on the economics of the private cloud, and the philosophy behind its implementation, in relation to the public cloud. These studies led IBM to present a different viewpoint regarding the private cloud. IBM also presented a new definition of fit-for-purpose as the decision process required to determine what workloads should run on what platforms, and the calculation of differentiated value using TCO and TCA in relation to workloads. The metrics for evaluating performance would be the ability to handle a variety of workloads efficiently and the impact on the TCA and TCO. The Cost-
Workload includes both the TCA (hardware, software, and services) and TCO (hardware, software, services, and labor). There are several implementation models for cloud computing. Among these are public, private and hybrid— a combination of the two. In addition, private cloud computing exists in two forms: homogeneous and heterogeneous. Homogeneous means the components run on the same architectures (for current purposes a single HW or OS platform), while heterogeneous includes several HW and OS platforms. This is a major element of the zEnterprise value proposition.

With a zEnterprise heterogeneous cloud, made up of workloads running on different platforms, organizations can derive a fit-for-purpose approach that runs workloads most efficiently, whether on z/OS, Linux, AIX or Windows operating systems.

The ability to consolidate workload deployment in a heterogeneous cloud reduces the overall requirement for software licenses. These cost savings will vary depending on usage and configuration, but they can be significant. The heterogeneous nature of the data center and the IBM-based heterogeneous cloud is a fit for that environment.

### Solution and Opportunities

The zEnterprise solution illustrated in the figure below includes:

- z/OS, z/VM and Linux on System z.
- Tivoli Integrated Service Management software.
- zBX using Power 7 and System x blades with AIX, LINUX, and Windows options.

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1 Labor on the public cloud is hard to quantify.
We will compare this zEnterprise configuration to a popular public cloud offering. The workload examples are 1332 light, 95 heavy CPU loads, and 68 heavy I/O loads. The light Intel workloads include applications such as Web or HTTP servers. The heavy UNIX workload is a compute-intensive workload, such as an application server, anything with a lot of number crunching, or floating point functions. Heavy I/O includes database accesses, an applications server with streaming content, or a content management application. All the work is accessing data on z/OS. The backend z/OS systems are constant in both scenarios.

The zEnterprise configurations needed to support the three workload types were derived from IBM benchmarks.1

The first comparison will be the TCA. The zEnterprise configuration consists of 32 IFLs (Integrated Facility for Linux), 28 Intel Blades, 28 Power Blades, totaling 704 cores, with a three-year TCA of $20.6 million. Using publicly available costs for deploying on these workloads on a public cloud, the TCA over three years is $99.2 million. The TCA for the zEnterprise heterogeneous cloud is 79 percent less than for the public cloud.8

To compute the TCO, we expand the comparison to include the public cloud’s labor costs of $9.7 million. The public cloud three-year TCO was calculated using a web-based tool made available by the service provider. The tool indicated that it required 42,086 labor hours/year to administer the public cloud. With an average of 40 hours/week over the 52 weeks, that requires 20.23 FTE administrators at $159,600/year, or $9.7 million. The comparable zEnterprise labor costs are $7.2 million. The study indicated that it required 31,146 labor hours/year to administer the...
heterogeneous cloud. With an average of 40 hours/week over the 52 weeks, that requires 14.97 administrators at $159,600/year annually each. The labor cost is $7.2 million.

This reduced labor cost is the result of visibility, and control: automation achieved using Tivoli Integrated Service Management software to provide a single point of management. The zEnterprise heterogeneous cloud saves an additional 26 percent in TCO over the public cloud.

**Conclusions**

The attractive feature of cloud computing is operational efficiency. In the past, many analysts contended that the private cloud did not provide the efficiency one should demand. IBM z Enterprise changes that, using the concept of the heterogeneous cloud to enable a fit-for-purpose strategy that delivers real value.

Rather than forcing all workloads to run on System z, the fit-for-purpose strategy enables workloads to be deployed where they run best. IBM Integrated Service Management software allows an organization to run them all in the zEnterprise environment and manage them from a single point of control.

Use the zEnterprise solution to go from consolidation to the next step of virtualization, building a private cloud from an existing environment.

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**Source:** IBM internal study: zEnterprise configurations needed to support the three workload types were derived from IBM benchmarks. Public cloud sizing needed to support the three workload types was calculated based on compute capacity of public cloud services.

**ii** The three-year TCO for the public cloud was calculated using web-based calculator made available by the service provider. The three-year TCO for zEnterprise includes hardware acquisition, maintenance, software acquisition, S&S, and labor. Based on US pricing; prices will vary by country.