

Optimizing Licensed Software Costs: A Comparative Analysis of IBM Power Virtual Server and Other Hyperscalers



 **PRECISION IT**

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Introduction

Precision IT's SaaS platform is used to help customers determine the optimal cloud, on-premises, and/or hybrid infrastructure for their workloads and applications. Many enterprises run per core/per socket licensed operating system (OS), middleware, and/or database software to support their applications and workloads. These enterprises often face critical selection decisions when considering hosting their workloads in the cloud for optimal performance, efficiency, and cost-effectiveness.

With many licensing models based on core or socket count and hardware performance, choosing the right hyperscaler can have a significant financial, performance, and operational impact. This white paper presents an analysis of four major hyperscalers running per core/socket licensed OS, middleware, and database: IBM Power Virtual Server (PowerVS), Microsoft Azure, Amazon Web Services (AWS), and Google Cloud Platform (GCP).

This whitepaper will overview and highlight how cloud choice can have a significant impact on licensing cost, performance, and total cost of ownership (TCO).

Hyperscaler Landscape

Public Cloud

Public cloud refers to a type of cloud computing in which resources are publicly available for subscription and consumption by any organization. Common examples of the public cloud include IBM Cloud, Microsoft® Azure, Amazon Web Services, and Google Cloud Platform. In this delivery model,

the provider owns and manages the infrastructure, removing this burden from the customer.

Cloud computing provides pooling of resources, on-demand scalability, broad access, elasticity, and measured Operational Expense (OpEx) cost models. Cloud offerings can provide greater flexibility, efficiency and strategic value compared to traditional on-premises IT infrastructure:

- Flexibility

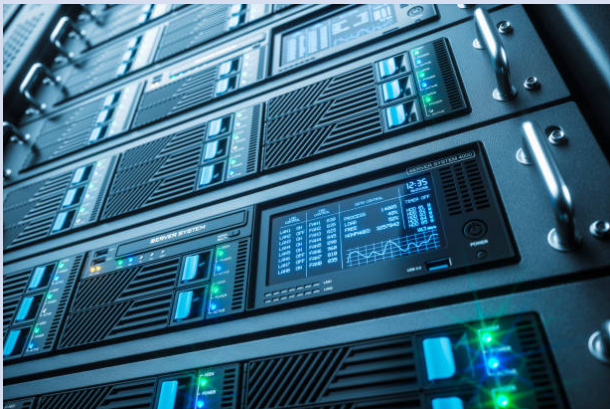
Users can scale services to fit their needs, customize applications and access cloud services from anywhere with an internet connection.

- Efficiency

Enterprise users can get applications to market quickly, without worrying about underlying infrastructure costs or maintenance.

- Strategic Value

Cloud services give enterprises a competitive advantage by providing the most current and innovative technology available.



“Raw core count is not the only metric that matters. Per-core performance (especially for per core licensed software), memory-to-core ratio, and overall system efficiency are just as vital.”

Unique Demands of Database Workloads

Per core licensed database software is common in most customer's application/workload stack. Often the database licensing and ongoing support costs account for 50% or more of the overall TCO for customers' software and infrastructure stacks. Due to the significant impact database software has on overall TCO costs, we are going to highlight cases of use with Oracle and IBM databases.

Oracle Database and IBM Db2 are powerful, enterprise-grade Relational Database Management System (RDBMS) platforms used for mission-critical workloads. However, robust database solutions come with unique infrastructure demands:

- **License-by-Core Model:** Oracle and IBM database licensing is typically calculated based on processor cores, making core efficiency critical.
- **Core Factors:** Oracle and IBM apply a “core factor” multiplier to different processor types to normalize licensing costs. For example, for Oracle Database licensing, IBM Power cores typically have a 1.0 factor, while many x86-based processors have a 0.5 factor, affecting how many database and database option licenses are required.
- **Performance vs. Cost Balance:** Raw core count isn't the only metric that matters. The per-core performance (especially for database and other per core licensed software), memory-to-core ratio, I/O throughput, and overall system efficiency are just as vital.

Running Oracle and IBM databases on fewer, more powerful cores can significantly reduce licensing and ongoing support costs, provided the infrastructure supports enterprise-grade scalability, resiliency, and availability.

Client Expectations of Cloud

Clients have diverse expectations when adopting cloud solutions, driven by the promise of operational efficiency, cost-effectiveness, and scalability. Key aspects include:



TCO of On-Premises vs. Cloud

Total Cost of Ownership (TCO) is a primary factor influencing cloud adoption. Traditional on-premises setups involve significant upfront capital expenditure on hardware and infrastructure, along with ongoing operational expenses for maintenance, energy, and personnel and datacenter costs. In contrast, cloud solutions typically offer a shift to operational expense (OpEx), which can be more predictable and scalable. The cost benefits of cloud solutions stem from the reduction of physical infrastructure, lower energy consumption, and reduced skill set requirements.



Reduction in Datacenter Space (Public Cloud)

Public cloud services significantly reduce the need for physical datacenter space. Organizations leveraging cloud

infrastructure can eliminate the need for on-premises datacenters, thus freeing up valuable real estate and reducing associated costs.



Reduction in Management/Skills Required

Servers

Cloud computing solutions reduce the need for extensive server management. By leveraging managed cloud services, organizations can offload routine server maintenance, upgrades, and monitoring, focusing instead on higher-value activities.

Storage

Cloud storage solutions streamline data management by offering scalable and flexible storage options without the need for extensive on-premises storage infrastructure. This reduces the burden on IT staff and minimizes storage-related challenges.

Networking/Switches

Cloud providers manage the networking infrastructure, simplifying the management and reducing the need for in-house expertise. This results in fewer physical switches and routers to manage streamlining network operations.



Reduction in Energy Consumption

Public cloud providers often operate at scale, enabling energy-efficient practices and technologies that are less feasible for

individual organizations to implement. As a result, organizations can benefit from lower energy consumption and a reduced carbon footprint by migrating to public cloud environments.

What is important from a TCO perspective

When evaluating which hyperscalers provide the best solution for optimal performance and TCO and ROI, the following factors are critical:

Cloud Architecture's Impact on Cloud Sizing and Software Licensing

There are generally two types of architecture hyperscalers can offer, predefined fixed configurations (instance types) or flexible configurations that enable the customer to define custom instances. The two differing cloud architectures impact on cost and performance can vary greatly. Thus, customers need to model their applications and workloads against the different architectures to determine which offers the optimal solution for their application stacks.

Hyperscalers offering fixed instance architecture provide a vast number of instance types, with AWS alone offering over 750 instances to choose from. Predefined instances help hyperscalers control costs and allow them to offer multiple generations of processors across their instance type families. However, the predefined combinations of compute, memory, network, and

storage often result in the overallocation of infrastructure resources due to the inability to configure the precise infrastructure needed. In addition, trying to determine the optimal predefined instance from hundreds of options spanning across multiple generations of processors can be cumbersome, time consuming, and complicated. In summary, many customers end up paying for infrastructure and additional software licenses and support that is not needed.

Hyperscalers architecture that allows customers the flexibility to configure custom instances enable right sized cloud configurations, thus significantly reducing the overallocation of infrastructure resources and paying for unneeded software licenses.

IBM PowerVS offers the most granular and flexible custom architecture in the industry, supporting almost any core to memory configuration. With IBM PowerVS' processor granularity configurable down to .25 of a processor and even less on dedicated machines, that coupled with memory granularity configurable to 1GB, customers can configure the optimal instance for almost any application or workload. In addition, IBM PowerVS has shared processor pools and entitled capacity that provide more flexibility and greater use of processor cores, which limits the number of cores that need to be licensed to the number of cores in the pool. Now that IBM Power11 is integrated into PowerVS, businesses gain even more performance and agility, thus offering superior TCO and ROI for workloads that are running per core licensed software.

AWS and MS Azure are both predefined instance types, while GCP offers predefined and custom instance types. AWS, MS Azure, and GCP each offer hundreds of instance types with up to four or more generations of processors. All three hyperscalers offer x86 (AMD/Intel) and ARM instances at competitive prices. However, it is important to not just consider the Total Cost of Acquisition (TCA) of their instance types and consider how these instance types affect the overall TCO, specifically per core licensed software and the

potential to be forced to oversize infrastructure instances to meet performance and memory constraints.

Cloud Sizing

The challenge both architectures face is the ability to quickly estimate performance requirements and right size to the optimal infrastructure instance.

The industry standard for cloud sizing is to take the utilized cores and memory an application is running on and then choose the appropriate preconfigured instance or custom instance that best meets performance and memory constraints. This approach can be very inaccurate and ineffective because the major hyperscalers offer multiple generations of processors along with multiple processor architectures to choose from (x86 – AMD/Intel and ARM). The multiple generations of processors and architecture types make it difficult to determine the relative performance that is needed to accurately size instances.

The best way to overcome these challenges is to utilize cloud and on-premises relative performance values to accurately size the required compute and memory resources. Utilizing relative performance values for sizing will help minimize the oversizing of infrastructure resources and paying for unneeded licensed software. Utilizing relative performance values for sizing with hyperscalers that support custom instances provides the best solution to optimize infrastructure resources, software license costs, and overall TCO.

Cloud Solution Modeling via Comparative Analytics

Precision IT's SaaS-based platform is used by end user clients, infrastructure and cloud providers, integrators, and consultancies to help customers optimize their IT assets. Below is a summary of Precision IT's comprehensive offering and approach to IT optimization.

- Provide comprehensive sizing, cost comparisons, and comparative analytics for Cloud, On-premises, Hybrid, and Multi-Cloud infrastructure environments.
- Provide vendor-agnostic insights for a detailed understanding of IT needs, right sized solution, and cost-optimized TCO/ROI business case.
- Software License Optimization (SLO) harnesses the power of data analytics to quickly assess software portfolios to ensure licensed software is running on-premises or in the cloud, at the lowest cost and best performance.
- Quickly size and forecast performance requirements and enable head-to-head performance comparisons across cloud and server vendors' products and configurations by utilizing unique Composite Performance Metrics (CPM) relative performance values.

Migration to Cloud - Analysis Methodology and Assumptions

Precision IT Assumptions Overview

Precision IT was asked to evaluate various hyperscalers to determine the best cloud solution that optimizes performance and costs. The customer provided Precision IT with multiple existing applications and infrastructure to use as a baseline for evaluation for the customer's initiative to migrate to public cloud. For the evaluation, the following hyperscalers were considered:

- **IBM PowerVS**
- **AWS**
- **MS Azure**
- **GCP**

The client's existing infrastructure consisted of various IBM Power9 servers running Oracle DB on AIX and IBM Db2 on IBM i.

Sizing and Performance Metrics

On-premises to cloud sizing was conducted based on existing infrastructure's utilized relative compute and Memory performance, then mapping to the optimal infrastructure instance in the respective cloud offering. Precision IT utilized its Composite Performance Metric (CPM) values determine the on-premises baseline performance for each existing infrastructure stack and its cloud CPM values to right size to the cloud infrastructure.

TCO Cost Categories

For all options, three year reserved pricing were used to evaluate infrastructure cloud costs:

- **Compute:** Processor and memory costs based on each platform's specifications.
- **Storage:** Sufficient storage for each environment, including scalability options.
- **Software:** Licensing costs for any relevant per core or per socket licensed software.
- **Networking:** Networking for on-premises and cloud alternatives.
- **Implementation and Migration Services:** Costs for the professional services required to implement and migrate to cloud.
- **Full-Time Equivalent Resource (FTE) Cost:** Operational resource costs required to manage the existing on-premises and new cloud environments.
- **Power and Cooling:** Power and cooling costs for each existing on-premises option.

Use Case 1: Existing IBM Power - AIX/Oracle DB Environment vs. Hyperscalers

3-year TCO Details

	Existing IBM Power9 E950 Environment	IBM PowerVS (3-year Reserved) Environment	Azure (3-year Reserved) Environment	AWS (3-year Reserved) Environment	GCP (3-year Reserved) Environment
Servers/Instances	1	N/A	N/A	N/A	N/A
VMs	12	12	12	12	12
Physical Cores	40	0	0	0	0
Virtual Cores	N/A	24 (physical)	160 (hyperthreaded)	128 (hyperthreaded)	256 (hyperthreaded)
Processors	4	N/A	N/A	N/A	N/A
Compute Performance Metric (CPM)	171.2	175.24	244.54	290.34	464.76
Total Memory (GB)	2,304	2,304	2,304	3,328	3,321
CPU Architecture	Power9	Power11	Various	Various	Various
Processor Speed (GHz)	3.4	4.0	Various	Various	Various
Useable Storage (TB)	25	25	25	25	25
Hardware/Lease Purchase Price	N/A	\$798,933	\$229,561	\$231,959	\$271,517
Hardware Maintenance (3-year)	\$26,200	Included	Included	Included	Included
Storage Cost	N/A	\$101,376	\$121,326	\$126,350	\$168,960
Storage Maintenance (3-year)	\$40,500	Included	Included	Included	Included
Network Costs @ 20,000 GB/month (3-year)	\$42,346	\$64,800	\$61,219	\$64,797	\$69,028
AIX Enterprise Edition License Cost (3-year)	N/A	Included	N/A	N/A	N/A
AIX Enterprise Edition Support Cost (3-year)	\$39,480	Included	N/A	N/A	N/A
PowerVM Enterprise Edition Support Cost (3-year)	\$15,360	Included	N/A	N/A	N/A
Red Hat Enterprise Linux Support Cost (3-year)	N/A	N/A	Included	Included	Included
Oracle DB Enterprise Edition Processor Support Cost (3-year)	\$627,000	\$376,200	\$1,254,000	\$1,003,200	\$2,006,400
Oracle Diagnostic Processor Support Cost (3-year)	\$99,000	\$59,400	\$99,000	\$158,400	\$316,800
Oracle Tuning Processor Support Cost (3-year)	\$66,000	\$39,600	\$132,000	\$105,600	\$211,200
Oracle Partitioning Processor Support Cost (3-year)	\$151,800	\$91,080	\$303,600	\$242,880	\$485,760
Implementation/Migration Services	N/A	\$40,000	\$160,000	\$160,000	\$160,000
FTE and Datacenter Costs (3-years)	\$142,000	\$60,000	\$60,000	\$60,000	\$60,000
Power/Cooling Cost (3-year)	\$42,990	Included	Included	Included	Included
Total 3-year Costs	\$1,292,676	\$1,631,389	\$2,420,706	\$2,153,186	\$3,749,665

Use Case 2: Existing IBM Power/IBM i/Db2 Environment vs. Hyperscalers

3-year TCO Details

	Existing IBM S924 Environment	IBM PowerVS Environment	AWS Environment	Azure Environment	GCP Environment
Servers/Instances	1	N/A	N/A	N/A	N/A
Cores/vCPUs	8 (6 Active)	4	48	24	48
Processors	1	N/A	N/A	N/A	N/A
Compute Performance Metric (CPM)	26.6	26.2	126.2	41.7	84.2
Total Memory (GB)	384	384	384	504	416
CPU Architecture	Power9	Power11	Xeon Platinum 8300C	Intel Gold 6200R	Xeon Platinum 8500C
Processor Speed (GHz)	3.8	3.0	2.5	3.4	2.1
Useable Storage (TB)	6	6	6	6	6
Compute+ Storage Purchase Price	N/A	\$196,440	\$90,255	\$64,803	\$89,511
Hardware Maintenance (3-year)	\$7,092	Included	Included	Included	Included
Storage Maintenance (3-year)	\$3,600	Included	Included	Included	Included
IBM i (P20) Support Cost (3-year)	\$177,826	N/A	N/A	N/A	N/A
IBM Db2 Advanced Enterprise Server Edition License Cost	N/A	N/A	\$3,128,160	\$1,564,080	\$3,128,160
IBM Db2 Advanced Enterprise Server Edition Support Cost (3-year)	N/A	N/A	\$1,876,896	\$938,448	\$1,407,672
IBM i (P10) Support Cost (3-year)	N/A	N/A	N/A	N/A	N/A
Implementation/Migration Cost	N/A	\$20,000	\$80,000	\$80,000	\$80,000
FTE Cost (3-year)	\$36,000	\$18,000	\$18,000	\$18,000	\$18,000
Power/Cooling Cost (3-year)	\$13,491	N/A	N/A	N/A	N/A
Total 3-year Costs	\$238,009	\$234,440	\$5,193,311	\$2,665,331	\$4,723,343

Disclaimer: The information provided in the above sample TCO Assessment are estimates and is provided for informational purposes only. Results obtained from individual TCO Assessments depend upon a number of variables derived from individual computing environments, scenarios and desired outcomes and will differ from the results expressed in the above table. Precision IT, Inc. is not responsible for any damages related to the information in this report, which is provided “as is” without warranty of any kind, whether express, implied, or statutory. Nothing in this report creates any warranties or representations from Precision IT, Inc.

Conclusions

Choosing the right platform for per-core licensed software and database workloads is not a one-size-fits-all decision. Core licensing models, per-core performance, platform compatibility, and operating environment all directly impact the total cost and overall efficiency of deployment.

Based on our analysis of Oracle Database workloads, IBM Power Virtual Server (PowerVS) with Power11 offers the lowest TCO and greatest advantages when it comes to per-core licensed workloads. For AIX-based environments, PowerVS delivered 25% lower TCO compared to AWS, Azure, and GCP—thanks to its ability to align compute resources precisely with licensing needs. For IBM i environments running adjacent Linux workloads with per-core licensed databases, the cost advantage was even more pronounced, with TCO savings exceeding 70%.

PowerVS’s granular architecture and industry-leading per-core performance eliminate the need to overprovision infrastructure or overpay for unused software licenses—two common challenges in hyperscaler deployments. For organizations with licensing-sensitive workloads, PowerVS offers a purpose-built cloud platform that combines flexibility, performance, and licensing efficiency in a way general-purpose clouds cannot match.

About Precision IT, Inc.

Precision IT, Inc., helps customers optimize their IT costs and productivity. Precision IT's SaaS-based analytics platform has provided thousands of assessments for customers that simplified their cloud, datacenter, and software decisions, while optimizing their costs, time, and resources. Precision IT's extensive cloud, data center, and software experience coupled with its cutting-edge technology, IP, and insights enables Precision IT to excel at helping customers significantly reduce their IT costs.

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