

# SOLITAIRE

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# INTERGLOBAL

## Supercharge Oracle Products with PureFlex Systems

*Efficiency and resiliency for your Oracle deployment with IBM PureFlex™ System*

### 1. Introduction

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In the marketplace, increasing number of vendors are offering converged infrastructure IT solutions. These solutions target rapid system deployment with pre-installed software, configured computing power, storage and networking, while addressing complexity by providing a level of integrated management. In this arena, the players include the IBM PureFlex System, which integrates IBM architectures (POWER® and x86), storage, network, and tools to allow customers the ability to quickly deploy new systems. The converged infrastructure offerings are especially appropriate for package or ERP deployments (e.g., Siebel, PeopleSoft, Oracle E-Business Suite, etc.), since they can be expedited prior to arrival at the customer site.

Oracle products are prime candidates for this type of deployment. The complexity of an Oracle deployment is significantly reduced, resulting in faster installation, while still maintaining some degree of flexibility. Oracle products work on many different platforms, spanning the gamut of physical servers and operating systems available in the marketplace. However, different platforms integrate with Oracle products at various levels, affecting the resulting efficiency, speed and flexibility of the deployments.

As more organizations implement systems on converged infrastructure solutions, the challenge of selecting the correct platform to get the maximum performance from the database and the applications it supports has increased. The complex needs of the workloads in this type of environment makes the selection of the platform difficult, since the collective processing mixes significantly different types of activities, ranging from OLTP to complex data analysis as well as the needs of diverse users.

The selection of the optimal platform for Oracle product deployment must include technical and business factors, but the overriding perspective is a business one. Since the impact of platform selection for Oracle product deployment is a difficult one to quantify on this level, IBM engaged Solitaire Interglobal Ltd. (SIL) to conduct surveys, gather data and perform analysis to provide a clear understanding of the benefits and relative costs that can be seen when organizations implement IBM PureFlex platforms as part of their Oracle IT architecture. This analysis has been primarily directed at the value of that platform use from a business perspective, so that those whose role it is to provide business leadership can understand the benefit of the IBM PureFlex architecture in deployment and operation of Oracle components.

During this study, the main behavioral characteristics of software and hardware were examined closely, within a large number of actual customer sites (11,610+). All of these customers are organizations that have deployed Oracle products on a converged

infrastructure as part of their production environment. This group has organizations that maintain both standalone Oracle product deployments and those that have customized Oracle E-Business Suite to support their specific functionality and business process, as well as applications that have been integrated with third-party or custom components. The information from these customer reports, and the accompanying mass of real-world details is invaluable, since it provides a realistic, rather than theoretical, understanding of how the choice of platform can affect the organization’s costs, risk and strategic positioning in the current marketplace.

In the collection and analysis of this data, a series of characteristics were derived. These characteristics affect the overt capacity, efficiency and reliability of the environment and its affects on operational and business performance. These characteristics have been examined within a business framework, since that is the perspective that is needed to make an informed decision. The business perspective encompasses a myriad of factors, including downtime, staffing levels, time-to-market (agility) and other effects. This is the basis for selection of an optimal platform for an organization’s Oracle product deployment.

## 2. Summary of Findings

The purpose of this analysis was to examine the real-world impact on businesses that deploy IBM’s PureFlex platform to host Oracle products, compared to those deploying Oracle products on other converged infrastructure solutions such as offerings from Cisco, Oracle, and HP, etc. The metrics used to analyze the differences in platforms were both objective and subjective. The objective metrics include reported data points on costs, run times, resource usages, and so on. The subjective metrics include responses on various levels and sources of customer satisfaction and perception. While overall customer satisfaction uses a variety of qualitative and quantitative measures, it still provides an end-result measurement of deployment success for the customer. A few of the highlighted findings can be seen in the quick summary below.

### Quick Summary

Category	Commentary	Quick Byte
Customer Satisfaction	The larger the deployment and the more comprehensive the Oracle product deployment, the higher the satisfaction for IBM PureFlex platform deployments.	Fewer end IT user complaints and reliable operations make management happier across the board.
Total Cost of Ownership (TCO)	Whether it is TCA or TCO, PureFlex is a cost-effective choice.	PureFlex TCO saves as much as 42.86% compared to less cost-effective options.
Availability	As the environment gets more highly leveraged, availability becomes more critical. PureFlex platforms show higher availability, with downtime as little as 58.26% of other options.	Reliable Oracle product operations on PureFlex mean higher availability.
Risk	The reported risk of deployment is considerably better for PureFlex Oracle implementations, reducing exposure by as much as 46.31%.	Flexible and powerful functions to share resources greatly lower the risk of deployment on PureFlex platforms.

These key findings are all substantial reasons to consider PureFlex platforms for an organization’s Oracle deployment.

## **2.1. Study Scope**

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In order to understand the impact of IBM PureFlex platforms as a key part of an organization's Oracle product deployment, a large number of deployments were examined. They included situations where the Oracle database, E-Business Suite and other Oracle application deployment choices were homogeneous within an organization and ones where a mixture of different platforms, software tools and components existed. The relative degree of difference in operating behavior for each factor, i.e., total number of outages, etc., was then compared to understand the net affect of the respective combinations. The effects were observed in general performance and capacity consumption, as well as other business metrics.

## **2.2. Methodology**

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The approach taken by SIL uses a compilation and correlation of operational production behavior, using real systems and real business activities. For the purposes of this investigation, over 11,610 environments were observed, recorded and analyzed to substantiate the findings. Using a large mass of customer and industry experiential data, a more accurate understanding of real-world behavior can be achieved. The data from these systems was used to construct a meaningful perspective on current operational challenges and benefits. The reported behavior of the systems was analyzed to isolate characteristics of the architecture from both a raw performance and a net business effect perspective. All input was restricted to those organizations using systems in versions that were current in calendar years 2010-2013. Since many of the components in this environment have releases at staggered points in time, only those components that were either the current version or a -1 version based on those calendar restrictions were included in the study. Additional information on the methodology and study diversity can be found in additional methodology notes at the end of this document.

In a situation such as that presented by this study, SIL uses an approach that incorporates the acquisition of operational data, including system activity information at a very detailed level. It should be noted that customers, running on their production platforms, provided all of the information. It is essential to understand that none of the data was captured from artificial benchmarks or constructed tests, since the value in this study comes from the understanding of the actual operational process within an organization, rather than the current perception of what is being done. Therefore, these sites have tuning that is representative of real-life situations, rather than an artificial benchmark configuration. Since the focus of this analysis was not to tightly define the differences among different minor variations of operating system or hardware, the various releases were combined to show overall architectural differences. This provides a more general view of architectural strategy.

The analysis of this data has produced findings in two groups of viewpoints – business management and technical management. For a more concise summation, those findings have been discussed separately in the body of the paper.

## 2.3. Business Perspective

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Ultimately, IT and technology are designed to support business functions. So one of the primary perspectives of the study was the view of the technology by an organization's business management, both executive and line-of-business. For the purposes of this part of the analysis, the patterns of operations from the study organizations have been grouped into similar categories and then compared to identify their affect on business metrics. These metrics are:

- Customer satisfaction
- Total cost of ownership
- IT stability, risk and reliability
- Agility (time-to-market)

Each of these business metrics has measurable and significant differentiation when the projected IBM PureFlex deployment solution is viewed.

The more granular business metrics are those measurements that show how a specific measure of success is different in the general population of the implementers versus those that have deployed PureFlex. These metrics are fairly broad in coverage and touch on areas of financial consideration, as well as organizational quality. Each metric is presented with a short definition and the focused net effect of IBM PureFlex platform using an Oracle deployment. In order to be meaningful across a variety of industries, all of the metrics have been normalized on a work-unit basis<sup>1</sup>, and categorized by levels of organization size (small, medium, large and very large). The base measure has been set by the medium company average, so that all other metrics are based on a variance from that standard set point. The implementations included in this study have been restricted to those implementations in production.

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### Customer Satisfaction – Executive Management

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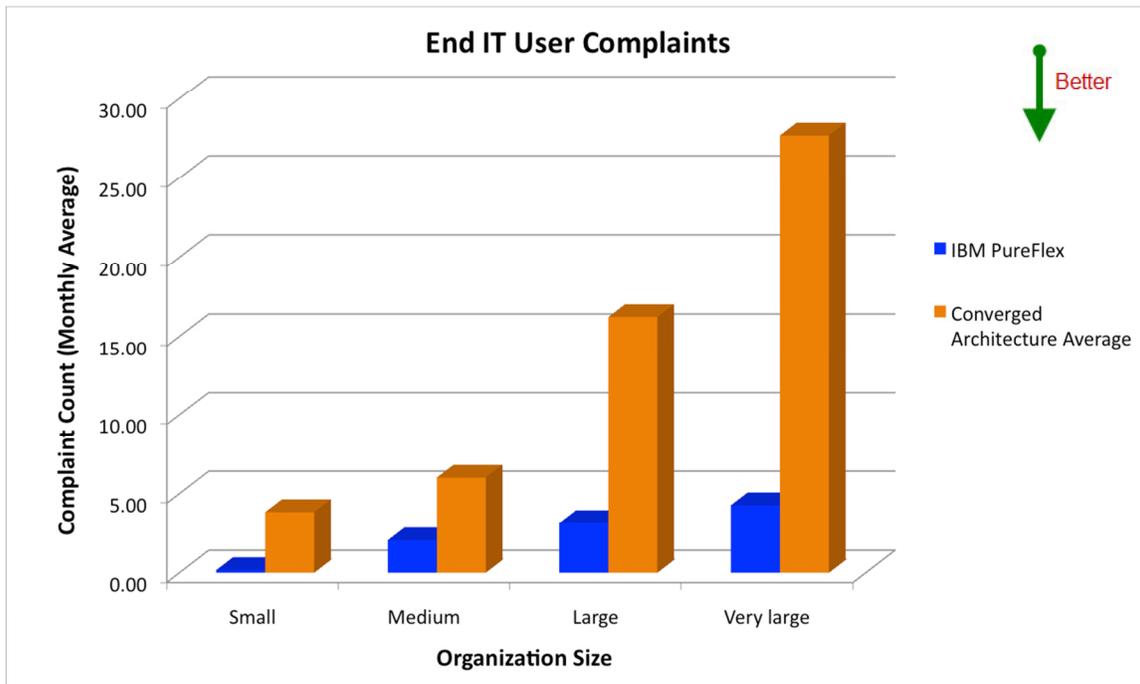
The ultimate metric on a successful implementation is *customer satisfaction*. SIL tracks this split out between the executive management and the operational input from a customer, since the perspective of the customer may radically differ between those two groups. The satisfaction of the customer executive management about their IT systems tends to focus on the application usage rather than any specific deployment platform. Although no application can work as well with a poorly configured or fragile Oracle deployment, the satisfaction with IT implementation and operation provides the most general metric for evaluation. This satisfaction rating was obtained from a large group of customers and provides a singular perspective on the overall success of the Oracle implementation. While this is a subjective rating provided by high-level organizational management, it does provide the business' actual perception of success.

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<sup>1</sup> Work-unit basis has been defined using the published International Function Point User Group standards and are based on function point (FP) analysis.



The advantages seen by the reporting clients show high satisfaction in the Oracle deployments run on PureFlex, much of which can be attributed to the number of complaints that the executives reported from their customers and users of those systems. The following chart shows the reported average monthly complaint count for the different platform groups. These complaints have been restricted to continued operational issues, and exclude complaints associated with missing and desired application functionality.



While the specific customer complaints can be affected by management techniques, application design and other factors, the relative comparison is a legitimate indicator of how well the operating system supports the processing at the organization. The three top reasons cited by executives from the reporting organization are:

1. Very rapid deployment
2. Smooth running operation with little downtime and complaints
3. Adherence to planned budget levels

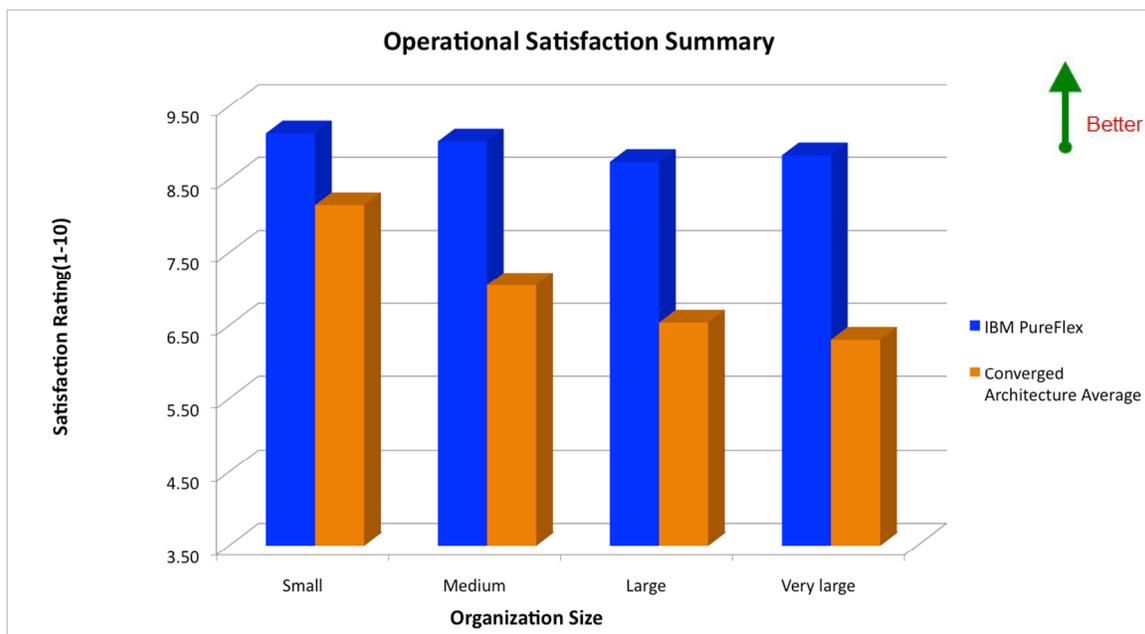
During the study data collection, many of the executives commented on their operation, satisfaction and other areas of the PureFlex Oracle implementation. One of the typical comments is encapsulated in the quote below. This quote is pertinent to applications running against an Oracle database on PureFlex platforms.

*“The converged infrastructure implementation that we did on PureFlex for our Oracle system was up and running in half the time that we expected. I have been very impressed with the support team and the early deployment has really made the LOB happy, which is a nice change!”*

Finance company CTO

## Customer Satisfaction - Operational

The operational perception of the customer, based on a variety of component metrics (e.g. support levels, communication, price, etc.), demonstrates satisfaction and success at the most generic level. This satisfaction metric is different from the overall satisfaction metric described earlier, in that the previous metric was gathered from the executive management level, while this metric examines the feedback from the operational side of the organization. This specific metric comes from information reported both by the IT departments and the line-of-business (LOB) groups.



The satisfaction of the IT operational staff and the LOB with the PureFlex Oracle deployments reflect the reliability and resiliency of the platform as a deployment choice,

in addition to the previously mentioned integration benefits. The most highly cited reasons for the satisfaction are:

1. Smooth running operation with little downtime and complaints
2. Consistent runtimes and load
3. Ability to shift resources as needed
4. Impressive management tools

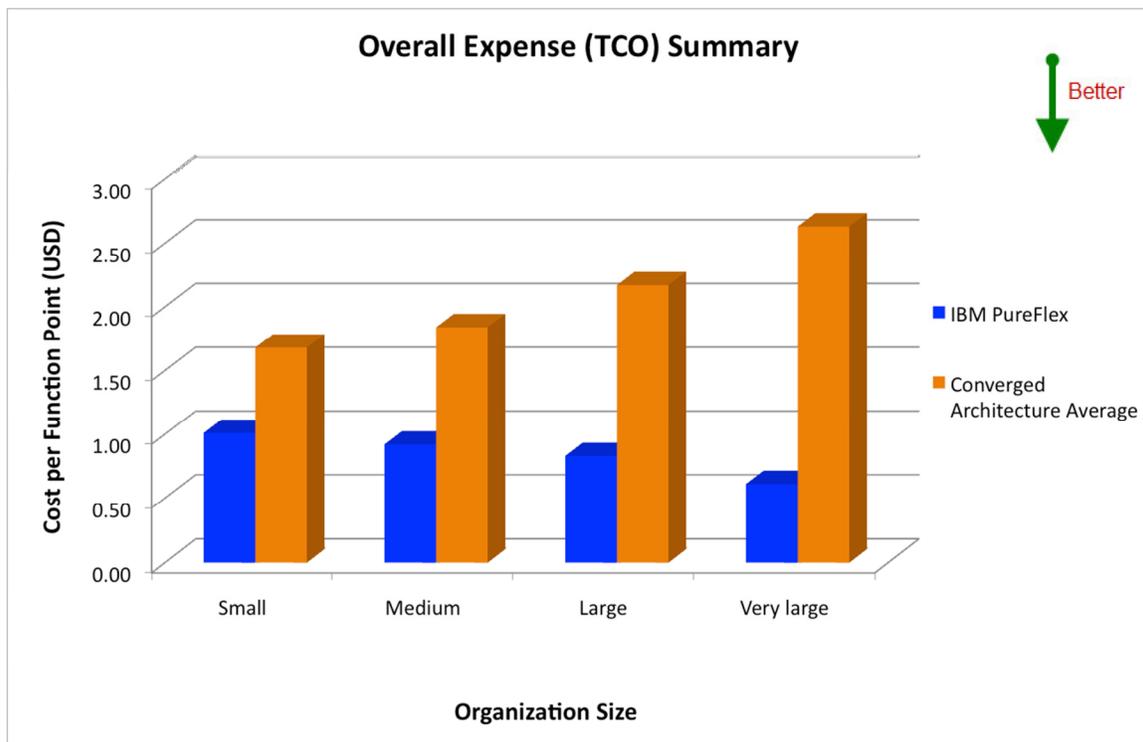
More than 99% of the reporting customers cited one or more of these reasons for their satisfaction.

*“The PureFlex Oracle deployment has performed flawlessly since deployment, despite it being the first time that we have used this platform. As a result, we have two more projects under consideration for movement to PureFlex in the next few months.*

Retail company CIO

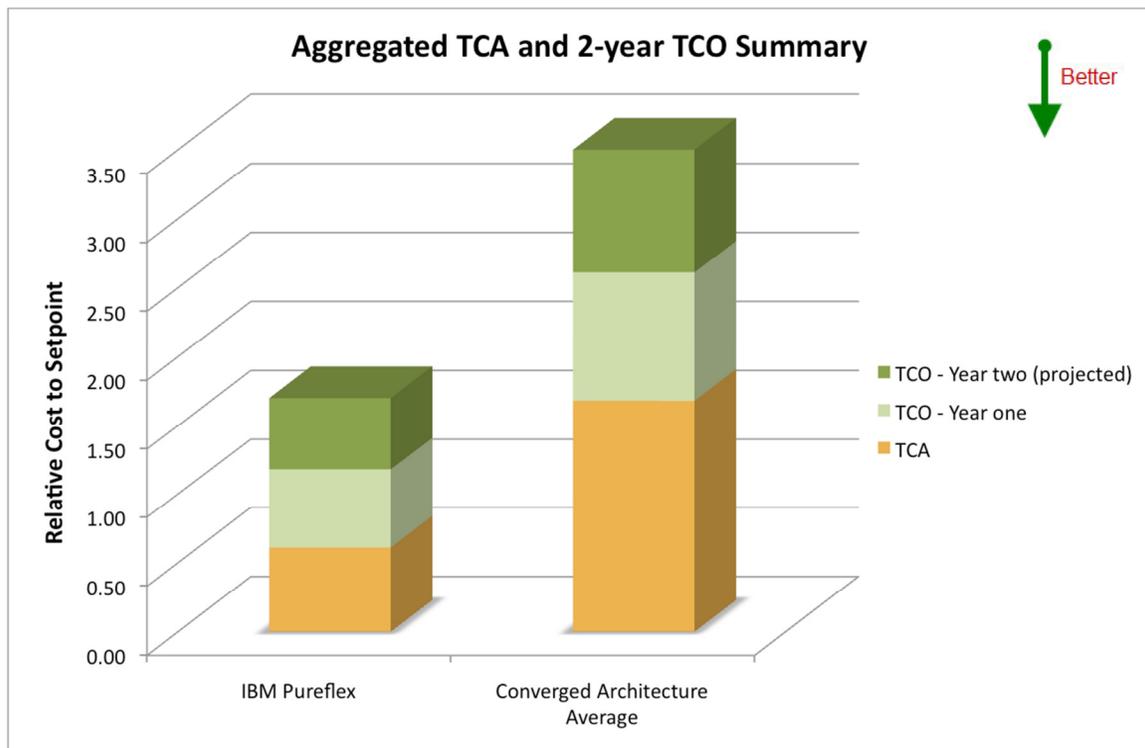
### Overall Expense (TCO)

This cost perspective looks at the total cost to the corporation during a specific time period. This is normalized on three bases: employee, sales revenue and legal entity count. These expenses span all of those included in the operational cost metric and are supplemented by expense contributions for physical plant, corporate overhead, long-term investments, etc. The TCO financial metric is more comprehensive than a straight operational metric. It should not be viewed in isolation, since extraordinary expense patterns for individual organizations may cause minor variance in the exact comparison values. For this reason, the comparison metric should be viewed as indicative and providing a general range rather than an exact value. However, with the large number of contributing organizations, the data is sufficiently large that, combined with the other business metrics, this comparison helps to set an appropriate perspective.



The IBM PureFlex and Oracle deployments show lower overall expenses, with the costs associated with the PureFlex platforms as little as 23.19% of competitive offerings over a wide range of organization sizes. It should be noted that this TCO comparison should be viewed in conjunction with availability and downtime metrics. Since no cost has been associated with unavailability, each organization should factor in its associated downtime cost to the TCO metric provided here. The downtime metric can be found later in this document.

The cost of acquisition is frequently perceived as higher with the PureFlex platforms than for other converged infrastructure platforms, although the reported data does not support this. This disparity in cost levels is only increased over time, as the defining metric switches from TCA to TCO. This switch happens in all deployments eventually, but is more rapid in the larger installations. The following chart shows the total cost of ownership over a period of three years. Since many of the converged infrastructure platforms have not been deployed in production for the full three-year period, the missing contribution has been projected based on the extant reports. This incorporates the TCA, with subsequent time periods of operation. The set point for comparison is once again the medium-sized average deployment TCA.



The shift from TCA to TCO as an accurate measure of organizational expenditure ranges from the 2-month to the 7-month point in time. Even though the change is dependent on a myriad of factors, the quickness of this shift for the organizations reporting in this study means that the TCO is a more appropriate metric for Oracle deployment decisions. Since the TCO holds true as a long-term metric, well past the usefulness of the TCA, the TCO is the defining cost metric for this study.

The difference in TCO among the solutions is based largely on the lower expenses for the efficient deployment and operations of the Oracle implementation and the lower overall

cost of the solution, including staffing. This is affected by the scope of the Oracle deployment, with increased expenditure efficiency present as the complexity and size of the deployment increases. These values are limited by current year costs and workloads, and incorporate organizations in various maturities of implementation, although all are in production.

Customers of all degrees of deployment reported a consistent pattern of differentiation in three main areas:

1. Lower staffing costs overall (due to tools, stability, etc.)
2. Lower licensing costs
3. Lower datacenter costs (environmental, facility, etc.)

More than 96% of the reporting organizations cited these factors as the most influential factor in their perception of cost.

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*“The PureFlex Oracle deployment has been a very cost-effective platform for us, as well as one that has really helped achieve our Seibel [sic] deployment goals. We plan on additional PureFlex deployments in the next six months, since the price point is easier to justify from a business perspective.”*

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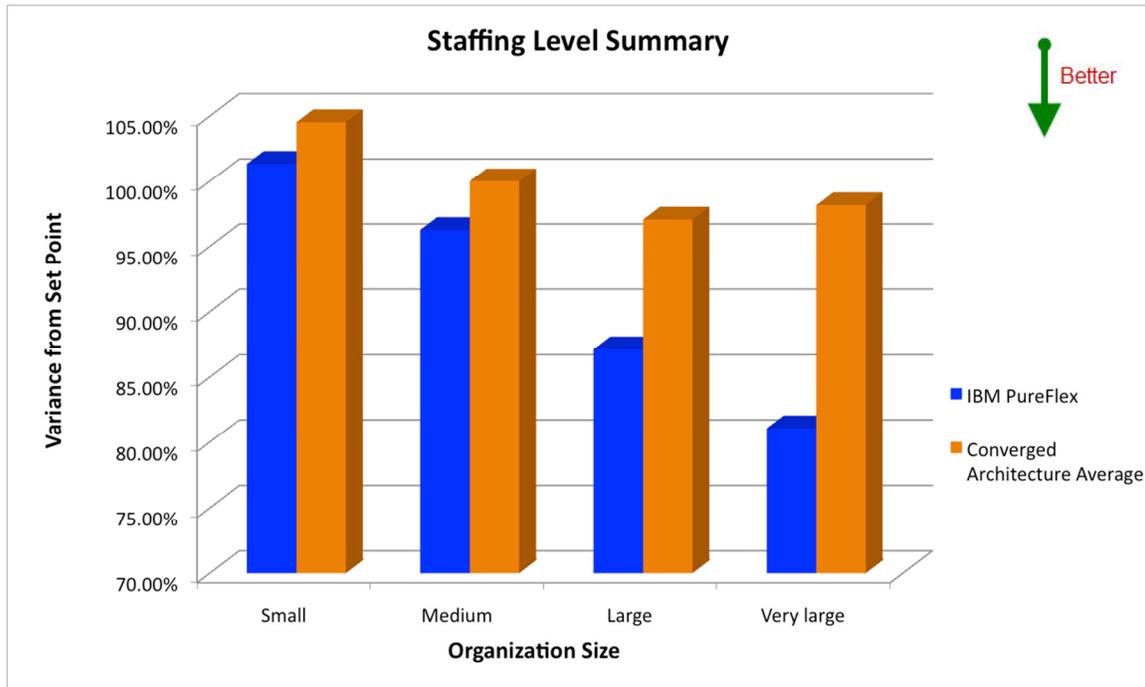
Retail company LOB director

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## **Staffing**

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An underlying factor that shows itself in many other areas is the effectiveness of the interface between the technical user and the infrastructure, including software, hardware and operating system components, and the subsequent effect on staffing. The efficiency of any of the specific components that provide that influence on the user experience are difficult to break down into metrics other than in overly-detailed comparisons that lose their effectiveness by virtue of the degree of detail. Therefore, a general view of the full-time staff position equivalents was reviewed to provide a general metric for the platform comparison. These levels are those required to maintain a “gold standard” environment for each deployment option. In order to provide a common comparison field, the workload on the systems was normalized to identical levels. The set point for comparison was selected as the staff level for a medium-sized organization average deployment.

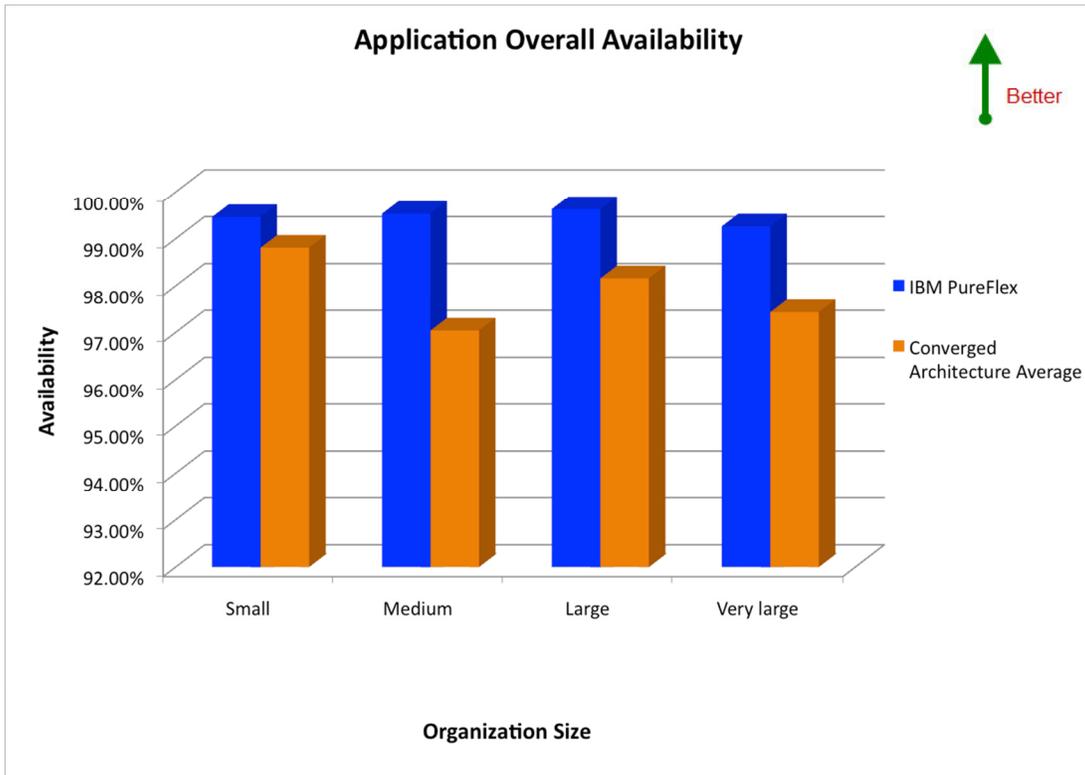


Standards of implementation as set by Oracle and any application vendors in their best practices guidelines have been used to define the rigor of the deployment processes and functions. It is important to keep the rigor of those standards in mind when reviewing the staffing. The noticeably lower staffing level for PureFlex deployment and use is directly attributable to an efficient unified workflow, as well as a substantially different mechanism to handle the allocation of virtualized resources. The normalized staffing levels for PureFlex deployment are smaller than those for the competitive offerings by as much as 32.65%.

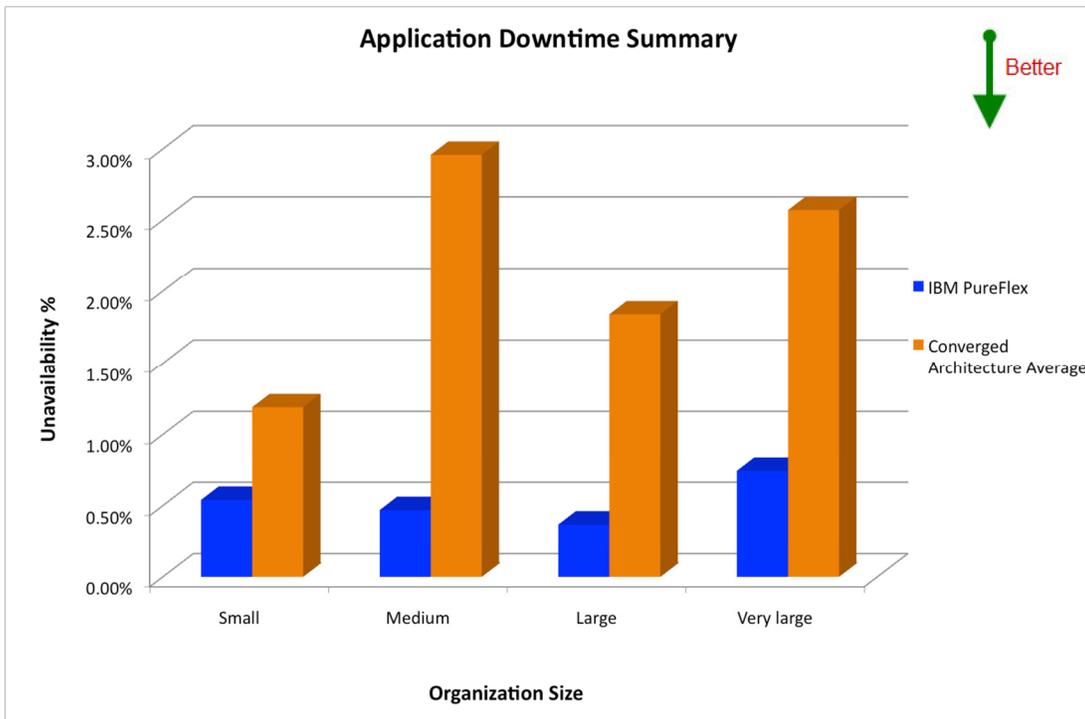
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### **IT Stability, Risk and Reliability**

Risk is composed of many factors. It includes the stability and reliability of the platform, as well as the chances of platform failure. IT stability and reliability metrics include all downtime, both planned and unplanned. The dependability of the implementation is a combination of the individual reliability of each component, along with the quality and effectiveness of the actual implementation. As such, both the planned and unplanned outages affect the overall usability of the total system. SIL views availability as a combination of all outages, i.e., network, hardware, OS, DBMS, etc.



Availability can also be viewed as downtime. In the chart below, the aggregate outages have been expressed as downtime. Since each of outages takes valuable access time away from the corporate resources, the correlation of outage and cost is very close. The percentage of time that those outages represent includes all forms of unavailability, irrespective of source.



The IBM PureFlex platforms report less than 20% of the total planned and unplanned downtime of the other platforms in the study. The difference in unavailability allows an organization more flexibility in its operations and figures prominently in the delivery of quality IT services.

This is an indication of how the PureFlex infrastructure contributes to both stability and reliability of an organization's Oracle implementation, due to the combination of high performance and native resilience. The study's three most cited reasons for high availability and lower downtime are:

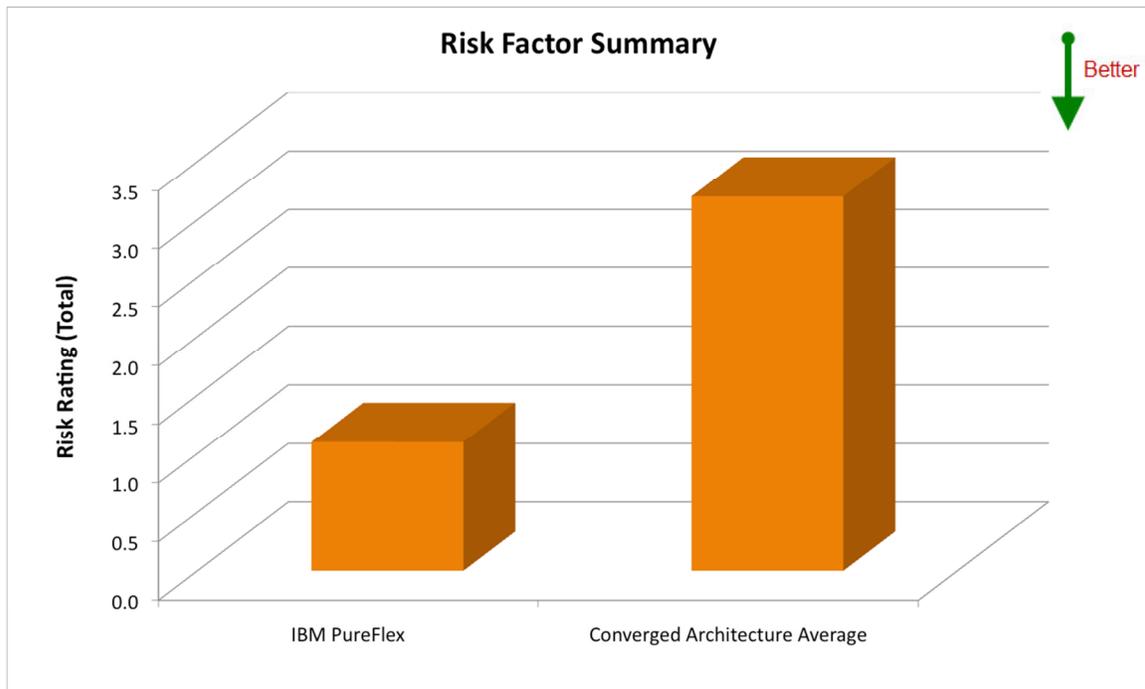
1. Fewer system crashes
2. Limited need to reboot the full platform
3. Fewer system patches and maintenance updates required

It should be noted that the practices of the individual organization when viewed from a best practices perspective makes a difference in the amount of planned downtime. However, the overall trend in availability is a definite indicator of platform stability.

Availability is one metric that feeds into operational risk. Examined as an actuarial metric, SIL considers risk to be comprised of three components:

- Percentage chance of component failure
- Percentage chance of budget or timeframe overrun
- Potential exposure, expressed as a percentage amount of overall budget or timeframe overrun

These three percentages are added to form the overall risk factor for a scenario. The risk factor summary for the platform scenarios is shown below.



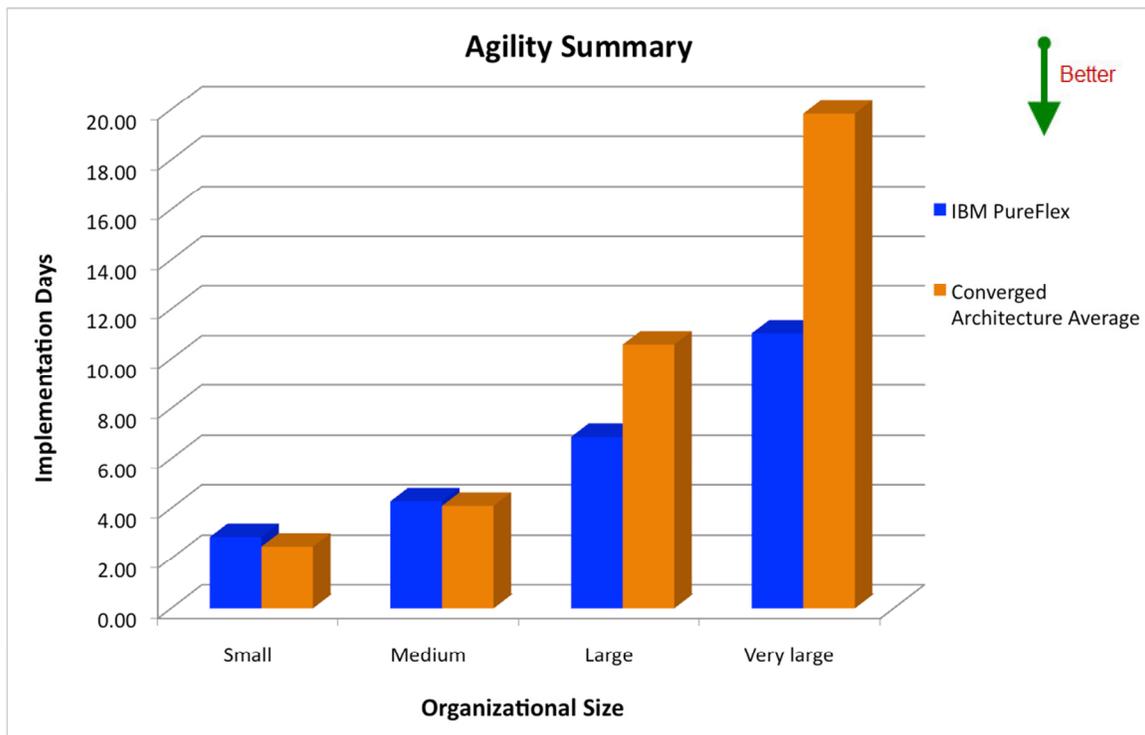
This graph shows that there is demonstrated risk mitigation from the general Oracle operations experience when using PureFlex systems. The risk exposure for IBM PureFlex Oracle deployment is significantly smaller than the competition, showing less

than 34.38% of the risk that has been reported for other deployment choices. Much of this lower risk can be attributed to the high resiliency of the deployment and increased efficiency of the resource allocation within the platform itself, which significantly lowers the risk of component failure.

## Agility

Agility is defined as the average number of calendar days from the start of an initiative to the start of full production operations for a project. This is NOT staff days or hours, but the actual calendar span, including all weekends, holidays, etc. All of the contributory factors, such as staffing and reliability, radically affect the speed in which a company can move a business concept from inception to market. This nimbleness is a key element of increasing market share and continued corporate viability.

While the performance metrics were gathered on the production systems, additional measurements were also collected to track the amount of time that the systems took to move from initial conception to full production implementation. The results demonstrate a significant increase in agility when PureFlex platforms run Oracle. This increase in agility has been reported to be as much as 44.41% faster for the PureFlex deployment option when compared against the overall study group. This translates into a faster time-to-market for business initiatives. The comparison is intended to be evocative and not quantitative, since other critical success factors, such as management methodology, resource availability, etc., can enter into this picture.



It is apparent from the reported data that there is a definite agility advantage to using PureFlex-deployed Oracle systems as compared to the overall experience, especially when organization standards for production system promotion are comprehensive.

When asked for specific sources of the agility, the most frequently cited reasons from customers are:

1. Ability to easily shift resources to accommodate new implementations
2. Speed of movement from non-production to production environments
3. Lack of system failures during deployment

The adherence to best practices is a common affect throughout any implementation analysis. With the complexity of Oracle deployments, best practices need to be followed both from Oracle and from the platform vendor. When virtualization is added in, a third level of best practice is mandated. This results in some significant differences in agility, since some virtualization methods include best practices that hamper agile deployment. When repetitive deployments are part of the organizational strategy, such as a world-wide roll-out, the influence on deployment schedules can be significant.

## **2.4. Technical Management Perspective**

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One of the main perspectives for this analysis is from the viewpoint of the IT management. This view looks at the operation management, including the technical aspects of complexity management, system efficiency and the security of an organization's data and processes.

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### **Complexity**

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One of the most significant and pervasive influences in the operational arena is the complexity of the information lifecycle. This complexity is the foundation of every aspect of the systems within an organization. Due to the very pervasive nature of this underlying principal, it is frequently ignored. However, losing sight of the major effect of any increase in complexity challenges the forming of strategic solutions. Complexity tends to creep into any system. Small changes that viewed in isolation as insignificant, in aggregate can be seen to have large effects. In information management, this frequently takes the form of the introduction of additional platform types, languages, operating systems, database management systems, etc. The establishment of the environments of lifecycle management and the associated versioning produces another layer of complication.

The metrics associated with complexity ratings are calculated on the basis of many factors. Most of these can be evaluated in a simplistic way by providing counts in the areas such as:

- Environments (development, testing, QA, production, HA, DR-BCP, etc.)
- Applications
- Platform types (mainframe, mid-range, Intel-based, etc.)
- Operating system (Windows, UNIX, Linux, zOS, etc.)
- DBMS (e.g., UDB, SQLServer, Oracle, Sybase)
- Languages (Perl, Java, etc.)

Minor changes in support of tactical improvements and shifting business needs can accumulate a significant influence on the complexity of the IT operation. Individually insignificant steps mark the evolution of the first-year complexity to the situation after two years of operations in an SIL customer. For this organization, the two years of evolution were compared to the base year. For the second year, the changes were mostly additions, including:

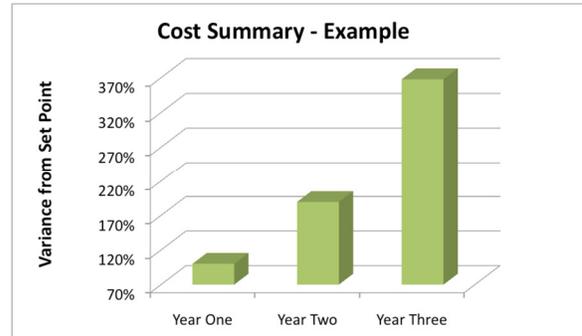
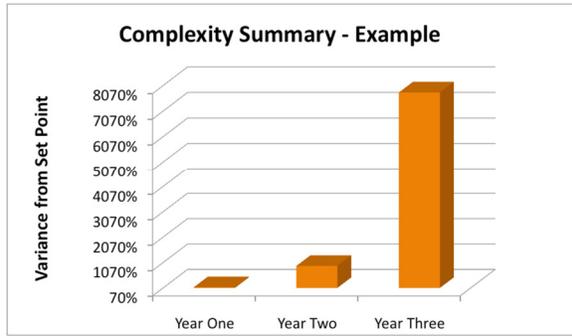
- applications +3
- platform architecture +1
- platform vendor +1
- operating system versions +2 with old versions retained to support uncertified applications
- DBMS versions +2 with old versions retained to support uncertified applications
- application releases per month +1

During the next year, more small changes occurred in the operation. These were small improvements and enhancements for the operations. The net additions were:

- environment +1 for stress testing
- storage architecture +1 for SAN
- DBMS versions +3 with two old versions retained to support uncertified applications
- application releases per month +2
- standard development language +1

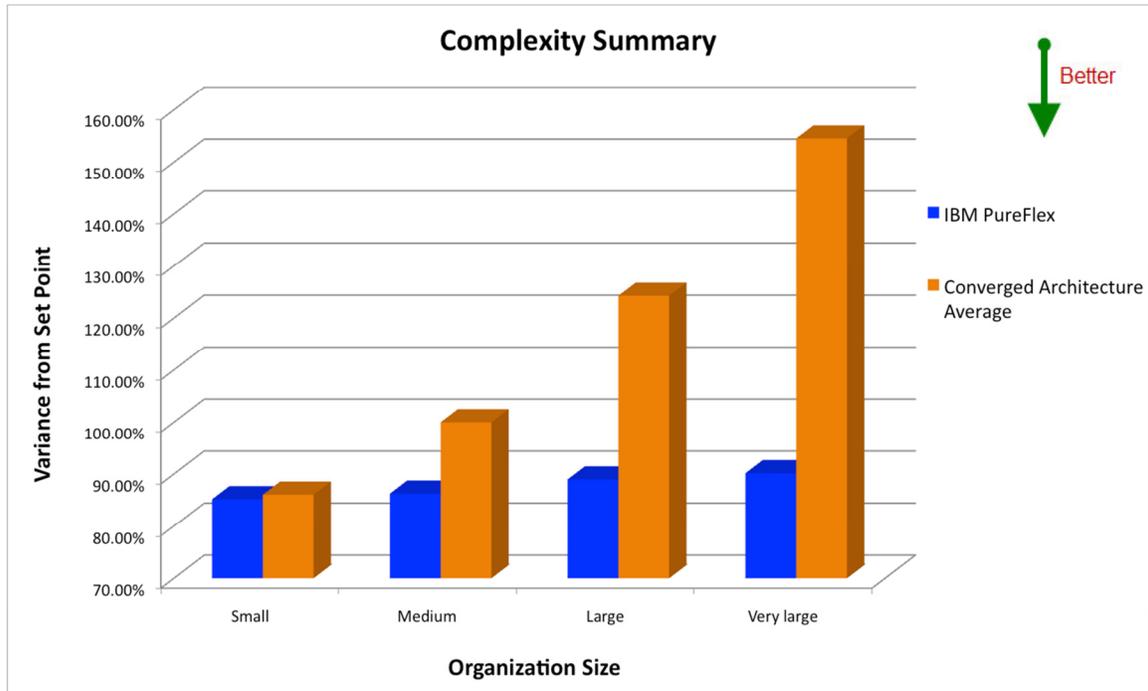
This example shows a slow increase in a relatively quiet operation. However, the complexity factor grew over the two years by more than **77 times**. Since the operational staff did not grow in proportion to the complexity from its starting point of 72 FTE, some aspects of best practice operations were economized over time. This resulted in a significant number of operational shortfalls, significantly lowered end-user satisfaction, and the occurrence of several substantial service failures.

The cost impact of the complexity is also startling. A summary of the customer IT costs along with the complexity shows the accelerating effects of the complexity. For the purposes of this example, the costs and complexity of the first year are used as a set point, and subsequent years are expressed in relation to that set point. While this example has been significantly simplified for brevity, the correlation of complexity and operational staffing is plainly an extremely important consideration.



Databases and ERP applications, such as the Oracle database and Oracle E-Business Suite, are considered to be complex systems. This generalization is accurate in that the integrated nature of ERP systems or comprehensive database deployments makes the understanding of management challenges and controls difficult. Complexity in the Oracle world can be viewed as a combination of concurrent users, the data (both at rest in the system and in use), and the number of functional modules that have been deployed, in addition to the basic metrics cited in the example. As seen in the complexity-cost correlation summary, the higher the complexity, the larger the effects on costs, as well as the exposure to performance risk and subsequent failure.

One method for controlling complexity is the addition of automated and intelligent tools, which can handle repeated operational tasks, such as load balancing, production moves and storage optimization, etc. This means that the number of tasks, context switches and technical frameworks that have to be supported by the operational personnel directly is reduced. The architectural tools can handle individual activities based on either a schedule or rules, and free the staff from those repeated and critical actions. The relative complexity for a normalized Oracle environment for each platform can be seen in the following chart. Once again the average medium-sized platform running Oracle has been used as the set point for comparison.



The impact on complexity that accompanies the platform is based on the integrated operational management suite and scripting capabilities. The IBM PureFlex solutions for Oracle incorporate tools and functionality that reduces the operational complexity for an Oracle database or application suite by up to 51.60%.

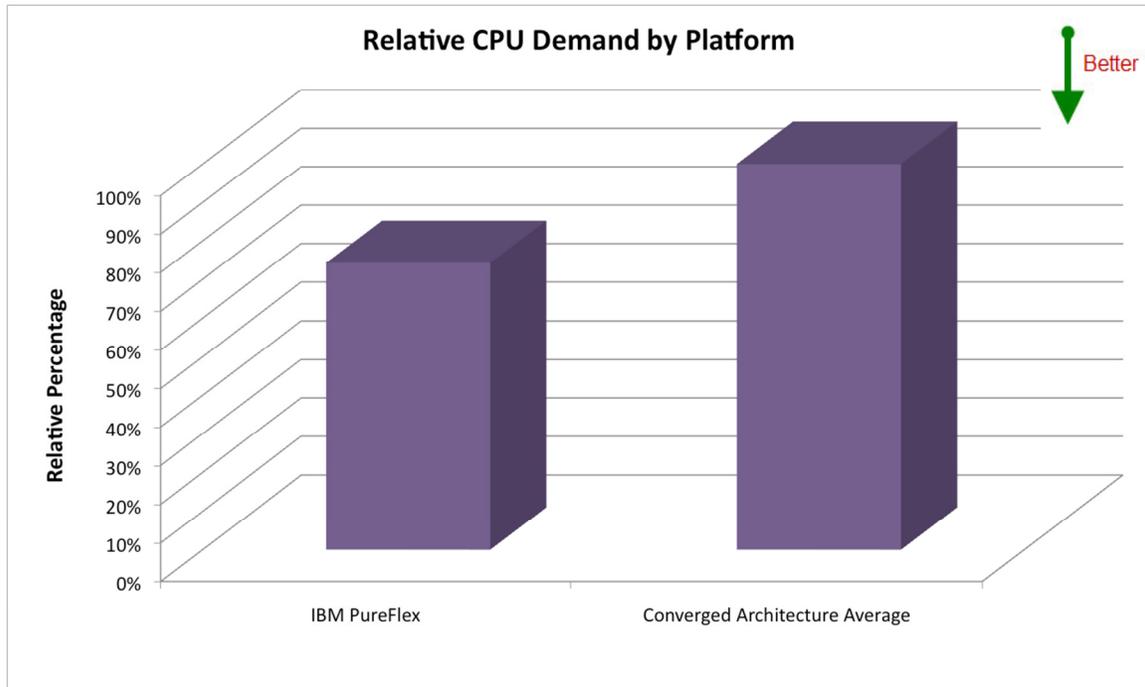
*“Our Oracle [E-Business] Suite deployment on PureFlex is very new, but we are already seeing savings in our staff time. I am also seeing fewer mistakes, which I believe comes from the tools that the PureFlex System provides. I have to say that I am pretty impressed so far.”*

Manufacturing IT Director

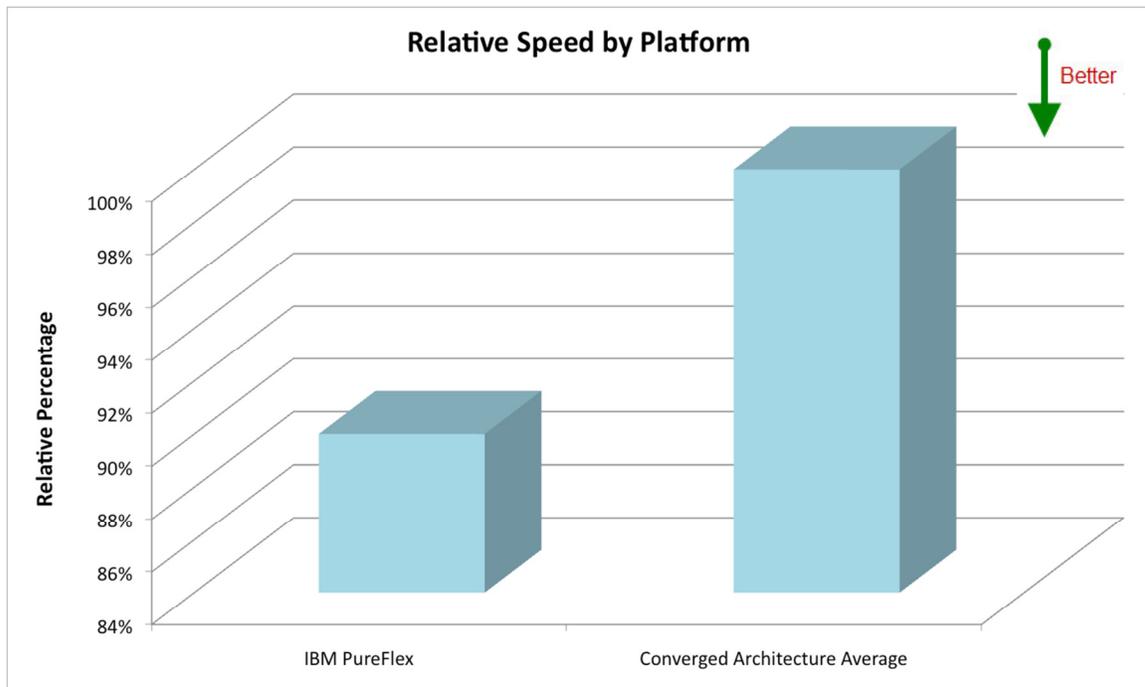
## System Efficiency

The ability of a system to fully utilize its resources is of significant importance when considering an infrastructure. In the server domain, system efficiency is the ability to process workload with minimal resources. PureFlex systems demonstrate architectural advantages requiring significantly less resources to process a given workload. These advantages stem in part from the efficient operating system instruction set and effective access to memory and I/O.

When comparing resource utilization across platforms for a given workload, the reported PureFlex utilization proved to be significantly smaller than the competitive offerings. Resources are released and reused more efficiently. This produces a shorter latency that results in a lower overall resource requirement such as CPU usage shown in the chart below.



Part of the reason that the overall resource usage is lower comes from the faster process throughput of transaction workload. These advantages partly stem from the efficient operating system instruction set and effective access to memory and I/O in the Purflex system. The net effect of differences in throughput is illustrated in the chart. This effect contributes to the resiliency of the platform and also the lower overall TCO.



The difference between PureFlex and the average converged infrastructure is a more efficient use of the system resources. The variances shown in the charts are from real-world, production operations, *not* artificial benchmarks. The data is a more accurate

measure of actual operational expectations and reflect a normal mixture of today's complex business.

Because PureFlex Systems are fairly new in the marketplace, making a comprehensive comparison of resource requirements difficult. However, in the reported performance of the PureFlex Systems, there is a significant amount of anecdotal comparisons. In particular, organizations that switch from another converged infrastructure to PureFlex for their Oracle E-Business Suite reported the following:

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*"We recently switched from a preconfigured infrastructure to a PureFlex system for our Oracle Suite deployment. We were very unhappy with the previous system, although the benefits of the turnkey platform are very attractive to us, so we decided to try IBM's version of the preconfigured setup. Even though the IBM people told us that we did not need as large of a system as we had before, we implemented the PureFlex platform in the same size (memory, processors, etc.), because we have been very concerned about performance and worried about reliability. Those worries were not justified with the PureFlex installation. We are using less than half of the resources that we needed before and our SLAs are being met 99.999% of the time. This is in contrast with the previous platform which did not even make the 75% SLA achievement. This is like a total different picture for us and one that is much easier to manage and run."*

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Retail IT operations manager

The overall impact of higher throughput and lower transaction latency is significant, and will be something that SIL will continue to track as the maturity of the PureFlex deployments continue.

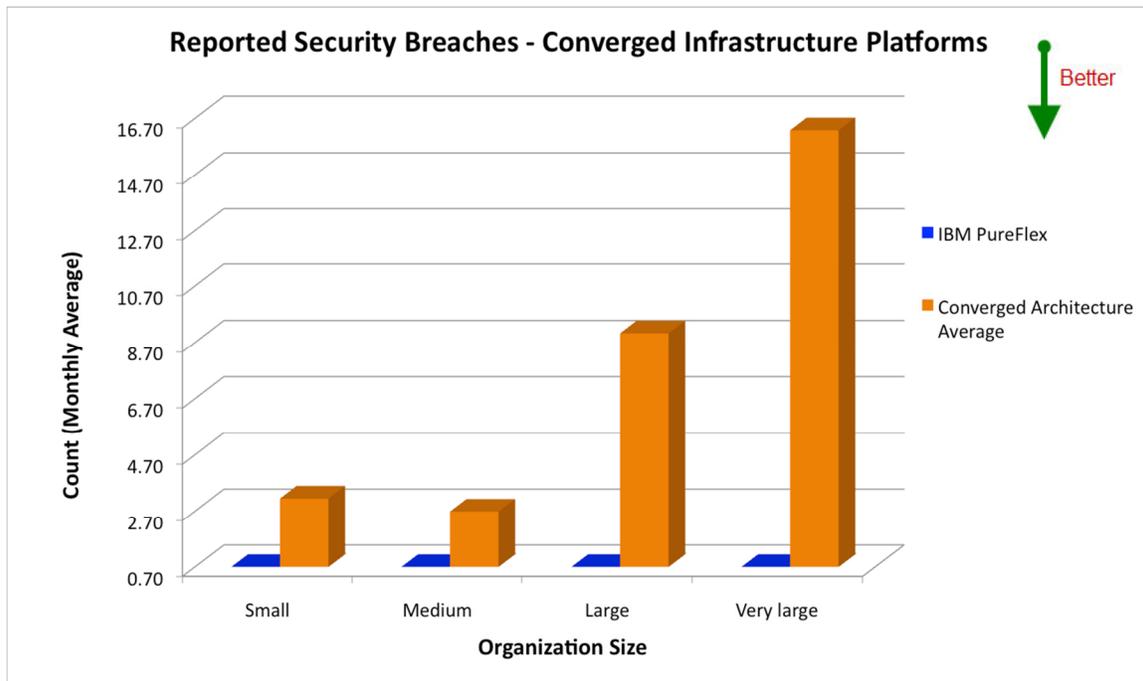
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## Security

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The security for databases and ERP systems, including Oracle products, can be very challenging. By nature, the mixture of application modules, user profiles, plug-in components and so on, provide many avenues for security breaches. Virtualization is also a factor, since it creates additional vulnerabilities. If the Oracle database and application security contributions are assumed to be the same across all the platforms, then the underlying security in the platform architecture can be seen. This forms another layer of protection for customer process, data and intellectual property.

The following chart shows the platform security breaches that were reported in the study organizations for their Oracle production environments, as related to the operating environment.



It is notable that there were no reported security breaches for IBM Power operating system in either a virtualized or un-virtualized environment during the study period. The overall increase in security breaches is of growing concern for all areas of an organization, and is fast becoming a critical consideration in the selection of IT architecture.

## 2.5. Conclusion

The Solitaire Interglobal Ltd. analysis of Oracle application and database deployments shows that there is a substantial advantage to incorporating the IBM PureFlex architecture within an organization’s IT architecture, based on a broad set of business and performance metrics. These include the high customer satisfaction ratings from both executive and operational management, as well as significantly lower risk rating than other converged infrastructure offerings. These advantages increase the effectiveness of any Oracle application or database deployment and translate to real-world positive results experienced and reported by the businesses in this study.

The economic benefits of selecting IBM PureFlex platforms as an Oracle deployment choice are also apparent in overall expense, both from a true cost of acquisition and from an operations perspective. The reduced complexity that is produced with the PureFlex tools help to minimize the resources needed to perform necessary tasks, both from a system side and from the demand for personnel time. This produces efficient application deployment and cost-effective expenditures, while displaying a risk profile that is substantially lower than the other available converged infrastructures.

Overall, critical effects on staffing, security, cost and satisfaction, as well as impressive reliability makes the IBM PureFlex converged architecture a strong candidate for an organization’s Oracle database, E-Business Suite or other Oracle application deployment choice.

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## About Solitaire Interglobal Ltd.

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Solitaire Interglobal Ltd. (SIL) is an expert services provider that specializes in applied predictive performance modeling. Established in 1978, SIL leverages extensive AI technology and proprietary chaos mathematics to analyze prophetic or forensic scenarios. SIL analysis provides over 4,100 customers worldwide with ongoing risk profiling, performance root cause analysis, environmental impact, capacity management, market trending, defect analysis, application Fourdham efficiency analysis, organizational dynamic leverage identification, as well as cost and expense dissection. SIL also provides RFP certification for vendor responses to government organizations around the world and many commercial firms.

A wide range of commercial and governmental hardware and software providers work with SIL to obtain certification for the performance capabilities and limitations of their offerings. SIL also works with these vendors to improve throughput and scalability for customer deployments and to provide risk profiles and other risk mitigation strategies. SIL has been involved deeply in the establishment of industrial standards and performance certification for the last several decades and has been conducting active information gathering for the Operational Characterization Master Study (OPMS) – chartered to develop better understanding of IT-centric organizational costs and behavioral characteristics. The OPMS has continued to build SIL's heuristic database, currently exceeding 95 PB of information. The increased statistical base has continued to improve SIL accuracy and analytical turnaround to unmatched levels in the industry. Overall, SIL runs over 45,000 models per year in support of both ongoing subscription customers and ad hoc inquiries.

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## Further Methodology Notes

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In order to support the comprehensive nature of this analysis, information from diverse deployments, industries, geographies, and vendors were obtained. In any collection of this type, there is some overlap that occurs, such as when multiple vendors are present at an organization. In such cases, the total of the discrete percentages may exceed 100%. Those organizations with a multi-layered deployment, such as multiple geographical locations or industrial classifications, have been analyzed with discrete breakouts of their feedback for all metrics. Additional filtering was performed to eliminate those implementations that substantially failed to meet best practices. Since the failure rates, poor performance and high costs that appear in a large number of those implementations have little to do with the actual hardware and software choices, these projects were removed from the analytical base of this study.

The industry representation covers manufacturing (16.08%), distribution (23.83%), healthcare (15.05%), retail (8.65%), financial (18.09%), public sector (7.28%), communications (9.05%) and a miscellaneous group (1.96%).

The geographies are also well represented with North and South America providing 51.50% of the reporting organizations, Europe 33.27%, Pacific Rim and Asia 11.25%, Africa 3.57%, and those organizations that do not fit into those geographic divisions reporting 0.41% of the information.

Since strategies and benefits tend to vary by organization size, SIL further groups the organizations by the categories of small, medium, large and extra large. These categories combine the number of employees and the gross annual revenue of the organization. This staff count multiplied by gross revenue creates a metric for definition that is used throughout the analysis. In this definition, a small organization could be expected to have fewer than 100 employees and gross less than \$20 million, or a value of 2,000, e.g., 100 (employees) X 20 (million dollars of gross revenue). An organization with 50 employees and gross revenue of \$40 million would have the same size rating, and would be grouped in the analysis with the first company. The classifications used by SIL use thresholds of 2,000 (small), 10,000 (medium), 100,000 (large) and 1,000,000 (extra large).

The information in this study has been gathered as part of the ongoing data collection and system support in which SIL has been involved since 1978. Customer personnel executed all tests at SIL customer sites. The results of the tests were posted to SIL via the normal, secured data collection points that have been used by those customers since their SIL support relationship was initiated. As information was received at the secure data point, the standard SIL AI processing prepared the data in a standard format, removing all detailed customer references. This scrubbed data was then input to the analysis and findings.

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