



Matching Scalability to Business Need

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Contents	
4	Overview
5	Business problems Matching BI/PM investments to existing requirements Supporting the business with complex toolsets
7	Business drivers
8	The solution
14	Conclusions
16	Appendix – Cognos 8 BI test topology

Abstract

Every organization is continually challenged to ensure its investments in technology and related processes match not only the current needs of the business, but the anticipated future requirements as well. As the company grows or otherwise changes, its technology must keep pace so that its people can optimally fulfill their roles.

As organizational processes and performance are transformed by enterprise-focused applications such as Business Intelligence (BI) and Customer Relationship Management (CRM), IT and business leaders often find themselves wrestling with the need to marry conflicting or otherwise unknown future needs with current ones.

A solution that may seem to cost less up-front can carry a significantly higher Total Cost of Ownership (TCO) because it fails to account for future changes in business requirements. Lack of visibility into future business direction may complicate the BI planning process. This reality reinforces the need to understand how a given solution can evolve over its projected lifespan, and whether it is sufficiently scalable to adapt to shifting business needs. This is especially critical when choosing an enterprise-class solution such as BI and Performance Management (PM) because a technology that cannot adapt can drive a litany of financial and productivity costs to the organization – costs that can ultimately reduce agility and competitiveness.

Because businesses are often challenged to accurately predict their future, choosing a BI solution that encompasses sufficient headroom to account for the likeliest roadmap can help organizations maximize performance and information agility over time. Because IBM Cognos 8 BI has been architected to scale across a broad range of platforms, your investment – and your business productivity – is maximized no matter how much you grow, or how fast. Whether you've already invested in AIX®-based technology or are looking for a hardware platform that can comfortably support expected growth and organizational change well into the future, IBM Cognos 8 BI can be properly tuned to adapt to your evolving business needs without requiring costly and risky midstream infrastructure replacement.

Overview

Not all BI solutions are created equally. As with most major technology acquisitions, it is important to compare the feature set of various solutions to ensure they meet business requirements and, more importantly, can be implemented into organizational workflows without requiring radical changes to roles and tasks. Things change, and scalability is critical to ensuring your organization can easily keep up with – and take advantage of – this evolution.

Tomorrow's business environment will look radically different than today's. As the organization enters new markets, exploits existing ones more deeply and responds to changing stakeholder needs, its systems and processes will be placed under greater stress. Technology solutions that make sense when you're a 100-employee company may be overwhelmed as you approach 1,000 seats and beyond. External factors, like increasing sales, geographic growth, tightening regulatory requirements and reduced go-to-market timelines also place pressures on systems – and people – that may be difficult to anticipate.

The IBM Cognos 8 platform was conceived to meet the needs of organizations of all sizes, in all sectors, and at all stages of business activity. It is completely open and heterogeneous, and because of its modern, service-oriented architecture it is completely infrastructure neutral and runs on any platform, including Windows, Unix, and Linux, including Linux for Power Systems™ and System z. This flexibility easily aligns it with future technology strategies to leverage the technology investments you have already made.

IBM Cognos 8 BI is also available for deployment on AIX systems running on POWER6™-based systems. For more globally-focused enterprises that have already deployed this architecture, or are in fast growth mode and consequently considering it, a BI solution that's built from the ground up to grow with the business is an absolute necessity. IBM Cognos 8 BI on AIX has been subjected to extensive load testing to ensure it easily handles everything a fast growing organization can throw at it. It avoids the kind of bottlenecks that stymie less capable platforms and balances implementation costs with capacity growth to closely mirror changing business requirements.

User Scalability Defined

IBM Cognos software group defines user scalability following industry best practices for CPU-bound processing that anticipates the variations expected in an environment as the user base grows and its use of the solution becomes both more extensive and more sophisticated.

The process of defining how well a given solution scales as the user environment changes typically involves setting initial performance expectations when hardware is constant and workload increases. For example, for a constant configuration of eight CPUs, as you increase workload by adding users, reports or units of work, the performance of a scalable solution changes proportionally (e.g., a performance graph shows a linearly increasing trend until the system is saturated.) This is critical for fast growing organizations, as they can easily accommodate ongoing business growth without expensive and disruptive changes to infrastructure.

Business problems

Matching BI/PM investments to existing requirements

As customers expand and standardize BI solutions across their organizations, expectations increase, especially in the areas of performance and scalability. Key challenges facing customers as they evaluate vendor solutions for deployment in their environments – and whether they possess sufficient scalability to meet current as well as future growth-driven needs – include the following:

- **Diversity.** Will the solution scale for all of the diverse uses and applications across my organization?
- **Predictability.** Will the solution scale predictably, so that I can forecast and budget rollouts with no surprises?
- **Investment fit.** Will the solution fit my investment strategy? Will it leverage my investment? Will it be optimized to give me the best performance both now and over time?

Business growth can strain operations and introduce additional uncertainties into near- and long-term planning efforts. Users and leaders alike expect their BI/PM solutions to keep pace with more complex business needs and tighter timelines. As systems are pushed harder by more end users, the risk of performance shortfalls or, worse, outages, grows. You need a platform that adapts to changes in your future requirements.

Things don't always work out that way, however. Planners may fail to build enough overhead into their capability planning. While this minimizes up-front costs, it exposes vulnerability in the event of rapid future growth. The opposite can also hold true, as overcapacity planning can inflate capital investment in infrastructure that may not be required for some time, if at all.

Clearly, every organization would ideally opt for a scalable solution to address these sizing challenges. But not all solutions are created equally, and scalability is not a universal capability.

Supporting the business with complex toolsets

The technical complexity of conventional BI/PM tools, coupled with the kind of IT resource constraints that are prevalent in most shops often conspire to limit rollout effectiveness, drive costs ever higher and strain existing resources throughout IT and the business.

Beyond a systems perspective, this situation challenges the user community by hampering access – in many cases completely – or providing access to the wrong information, delivering poor, often unstable performance. When mission critical BI/PM systems fail to deliver the goods, the user community is less likely to adopt the system. Even IT loses confidence as managers scramble to reset and meet user expectations without sacrificing other areas within the IT organization.

Business drivers

Although IT has always been under pressure to add value to all aspects of an organization's business capabilities, the economic downturn has raised the stakes. Business areas face unprecedented internal and external challenges to perform more effectively, more quickly and more efficiently. They must wrestle with reduced product/service development and go-to-market timelines, constrained staffing and budgets, limited system and process flexibility and tightening market and regulatory conditions. Despite these challenges, they must use their BI and PM solutions to meet day-to-day reporting needs for the business, including:

- Getting IT to address new business requirements quickly.
- Achieving fast turnaround when creating and generating new reports.
- Accessing information when, where and how they want, such as on their mobile device while on the road, within Microsoft Office, etc.
- Obtaining the same numbers regardless of what BI capability – report, dashboard, scorecard, etc. – they wish to use.

IT must rise to the occasion by implementing systems and processes that allow business resources to raise the bar. To accomplish this, it must:

- Pace spending to optimize value derived from current-generation technology investments.
- Deploy BI/PM solutions faster with limited resources and budgets and smaller headcount.
- Maintain service level agreements despite these restrictions.
- Optimize performance derived from existing systems.

- Predict performance to develop an effective deployment strategy.
- Minimize disruption and risk associated with upgrading and migrating.
- Match system and process roadmaps to underlying business requirements and plan ongoing spending to match investments to changing business conditions.

While the impact of an ever tightening operational environment is profound on an organizational level, it is just as significant at the systems architecture level. Enterprise solutions are especially sensitive to the seemingly divergent requirements of IT and business. And as pressures mount to do more with less, growing the capacity of an enterprise solution without disrupting day-to-day workflow or otherwise busting the capital budget is an almost impossible task for most solutions.

Except ours.

Solution

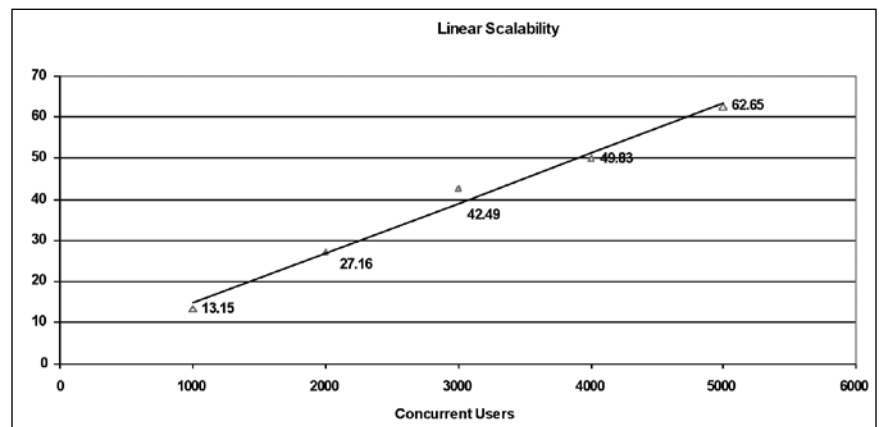
IBM Cognos 8 BI eliminates the unpredictable response times that can put projects at risk or limit broad deployment. It delivers the right information at the right time to the right people to ensure they have everything they need to make the best possible decisions. Its ability to run on any platform makes it a best of breed choice to easily scale. As your company grows, IBM Cognos 8 BI on AIX grows, too, and lets you cost effectively add capacity to stay ahead of your growing needs. This unique combination of expandability and scalability gives IT and users competitive flexibility.

Tested to scale

Extensive scalability and optimization testing conducted on IBM Cognos 8 BI on AIX and Power Systems platforms reinforces the solution's ability to deliver complete, consistent and timely information with cost-effective scale. To determine just how well the platform can scale to meet fast-changing business needs, IBM

invested in a wide ranging scale testing and optimization effort that focused on very large user scalability on AIX and POWER6 servers. The results were precisely what today's businesses want to hear: IBM Cognos scales very well on AIX and POWER6 servers.

As illustrated in the following table, the IBM Cognos 8 Platform demonstrated predictable linear scalability:



The results of this scalability and performance testing clearly illustrate IBM Cognos 8 BI's ability to deliver enterprise-level performance and scalability that more than meets the diverse and complex BI needs of global organizations. Specifically, the results demonstrate:

- The solution delivers mission-critical performance and scalability, as the number of users increased the average response time increased in a linear fashion. Additional testing to emulate extreme concurrency requirements similar to operational reporting was also run successfully with up to 10,000 concurrent requests.
- Optimization resources, available through IBM Cognos Service Configuration, can result in significantly enhanced performance. In one case, testing showed that simply tuning AIX memory and thread handling parameters boosted performance across all test cases by 60%.

- Our platform's proven linear scalability provides administrators with the ability to proactively plan for resources when scaling their solutions. This allows IT to more precisely plan and manage the BI/PM infrastructure. In addition to returning optimal end-user response times both during deployment and beyond, it also increases IT's ability to scale the solution as user community-driven demand grows over time.
- Deployment strategy is much more predictable because the testing process accurately predicts scalability. Budget and resource allocations can also be more strategically managed because resource and hardware requirements throughout the platform's lifecycle are known.

This performance optimization analysis has also resulted in the creation of best practices that allow organizations to maximize transaction throughput and minimize response times. This improved performance supports more complex workflows that in turn encourage BI use in a wider range of business scenarios.

This improved scalability also enhances adoption efforts. As organizations look to expand their investments in BI as a way to leverage economies of scale, greater front-end and back-end throughput increases the likelihood of widespread end user adoption.

For additional details on the optimization study, please see the following white paper, *Cognos 8 Business Intelligence (BI) on IBM AIX best practices: Optimizing and scaling Cognos 8 BI on IBM AIX*. The appendix to this paper includes an excerpt from that paper as well.

User Community Terms and Sizes

To accurately judge the number of users that can be supported in a real-world environment based on performance in a test environment, it is necessary to distinguish between named, active, and concurrent users.

Named users make up the total population of individuals who can be identified by and potentially use the system. They represent the total user community, and can be active or concurrent at any time. In a real-life BI environment, this is the total number of individuals authorized to use the system. This is the number of most interest to organizations planning a BI implementation, because it tells those organizations how many users they can expect to support in a given environment with the response times reported in a test environment.

Active users are logged on to the system at a given time and can send a processing request at any time. For example, users who are viewing the results returned from a query are active users, although they are not currently stressing the system.

Concurrent users are not only logged on to the system (active), but are sending a request or waiting for a response. They are the only type of user actually stressing the system at any given time. IBM Cognos tests using concurrent users who actively stress the system, adding load at all times during the test cycle.

Concurrency Ratio refers to the number of concurrent requests at any moment in time that defines the load on the system. The system should be designed so that at peak loading, the number of simultaneous requests coming in can be satisfied comfortably. A general rule of thumb in estimating workload

is that approximately 1% of named users or 10% of active users will equate to the number of concurrent requests the system must manage per second. The following table illustrates the relationship between the number of concurrent users employed in a test environment and the number of users in a real-life environment for which the test results can be reasonably reported.

Estimating Named Users Based on Concurrent Users

A test involving this many Concurrent users	Approximates an environment with this many Active users	And this many Named users
100	1,000	10,000
250	2,500	25,000
500	5,000	50,000

Source: "Testing the Typical BI Day," IBM Cognos, January 2008.

Test scenario

The testing process, conducted at the IBM Cognos Labs in Ottawa, went beyond hardware-based performance capabilities. It also focused on typical BI activities that the average end user might be expected to encounter on a day-to-day basis. The scenarios were suggested by customers, analysts and IBM Cognos professional services personnel, and were designed to simulate a real-world, enterprise BI environment in which users conduct a variety of role-based activities across the full spectrum of reporting and analysis.

This customer-centric approach to testing allows the results to be easily mapped into any organization's own operational environment. Unlike other testing methodologies whose output may not directly feed into planning efforts, this methodology is directly applicable, and allows companies that adopt IBM Cognos 8 BI to:

- **Meet performance service level agreements.** Predictable performance allows IT to effectively plan deployment hardware requirements to meet the performance SLAs upon implementation.

- **Manage user expectations.** Understanding performance allows the IT department to effectively communicate with users about performance considerations prior to implementation. An effective communication strategy ensures that users' expectations are realistic when a system is deployed.
- **Maximize IT investment.** A crucial part of maximizing your overall investment is managing the timing of IT infrastructure spend. Last minute purchases to handle unexpected performance results reduce the ability to flexibly manage your IT budget.

Optimized business processes

The net result for any business in any sector is a shift away from a patchwork of ineffective data management tools and processes and toward an environment that supports the gathering and sharing of BI/PM best practices. Decision-making tools are implemented and configured in a manner that both more closely aligns with and supports fast evolving business needs. Just as significantly, stakeholder expectations can be more effectively met because more people within the organization have access to the resources to make it happen.

What IBM Cognos software brings to the table is a single point of contact for the industry's most focused, scalable and business-ready BI/PM platform. The IBM Cognos software advantage includes:

- **Simultaneous support.** One place for the customer to obtain support and get answers to every question.
- **Integrated approaches and bundles** that make both market and business sense.
- **Easier to adopt and deploy** in a wide range of customer environments. No matter what market, this makes for faster, less disruptive deployment, too.
- **Bundled.** Simpler, faster, easier when using multiple IBM products.

Whatever the business need and whatever the platform, IBM Cognos BI solutions are uniquely optimized to reflect our best of breed BI/PM legacy while simultaneously leveraging the core strengths of the IBM organization. This differentiated advantage allows us to create real value for our customers, and more easily build, deploy and exploit the capabilities of our platform.

What does this mean to you? It means confidence that the solution won't run out of gas as BI is deployed to more stakeholders, as business needs intensify and as infrastructure scope and complexity increase. For organizations with ambitious growth requirements and potentially global reach, IBM Cognos 8 BI on the AIX platform is more than a cost effective starting point – it also optimizes TCO over the life of the implementation as it continues to support the business, wherever that may be.

Conclusions

Because the only constant in business is change, IT will forever be challenged to ensure the systems and processes it implements are capable of cost effectively adapting to ongoing evolution in the organization's operating environment. It isn't good enough to sign off on a solution simply because it works today. Unless it's mostly ready for whatever can be reasonably expected to occur, planning efforts are incomplete.

If it works today, it may not necessarily work tomorrow. As the number of users increases, response times can proportionately increase – often to the point that the solution falls short of meeting business needs. When this happens, end users revert to ad hoc solutions that may have worked for them in the past – individual spreadsheets, manual access to disconnected data and even guesswork. Decision-making suffers and, as a result, so do business agility and effectiveness.

Staying on top of the linear relationship between expected response time and number of users is crucial to ensuring all users – from report writers and managers to analysts and senior executives – can leverage the tools at their disposal to support their work. It is equally important to understand workload in each area of the business to properly assess how typical usage will affect overall system performance. The final challenge is to then project those typical workloads over time to understand how system architecture needs to be maintained.

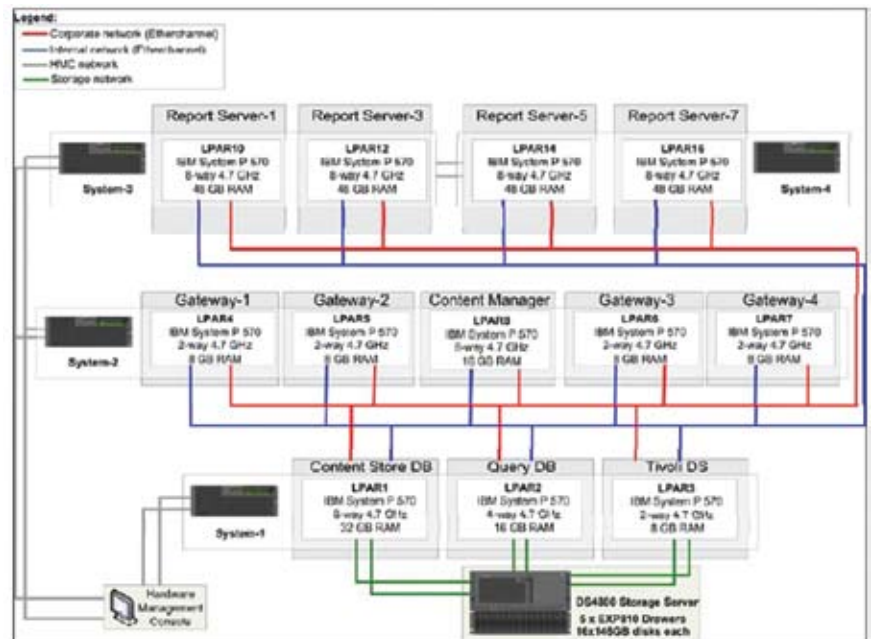
Because growth is not always predictable or linear in its own right, it is essential to choose a BI platform that is highly scalable. The more an organization understands how a chosen system will perform as environmental factors and needs intensify, the more easily it can avoid the kind of performance hiccups that bring other, less scalable solutions to their knees.

IBM Cognos 8 BI delivers performance and scalability for large numbers of users. On AIX and POWER6-based systems, it scales in a clearly linear manner – which gives planners everything they need to know to ensure it meets today's needs with ease, and will easily meet tomorrow's needs as well. You may not have to concurrently support a million users simultaneously running everything from simple report delivery to complex analysis. But having a platform in place that is capable of easily scaling in scenarios that would force competing solutions to fail outright is fundamental to giving your business the edge it needs to keep growing and winning in uncertain market conditions.

Appendix – Cognos 8 BI test topology

To effectively demonstrate the linear scalability of Cognos 8 on AIX and POWER6 processor-based systems, it was necessary to assemble the software environment in a way that accurately reflects a typical scenario that is deployed by e-business customers.

The following server topology was implemented in the IBM Benchmark Center to show the scalability of Cognos 8 BI with up to 10,000 concurrent user-request loads on IBM POWER6 processor-based hardware running AIX. Test results confirm that the Cognos 8 BI shows excellent stability, and scales predictably even under extreme concurrent load.





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