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Building The Business Case For APM

by Phil Murphy

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Dashboards Increase Your Capacity To Innovate And Rebalance IT Spending

This is the fifth document in the “Modernizing The Practice Of Application Maintenance” series.

by **Phil Murphy**

with Laurie M. Orlov, Mike Gilpin, and Kimberly Q. Dowling

EXECUTIVE SUMMARY

In a small number of firms today, IT management is using application portfolio management (APM) tools to shave 10% to 30% or more from the maintenance budget, achieving ROI within the first 12 months. These savings provide the opportunity to increase innovation capacity by 30% to 95%. Detailed application metrics allow IT management to discuss spending in business terms with system stakeholders, resulting in greatly improved business/IT relationships in these firms. CIOs of medium-size to large organizations really can't afford not to make APM a top priority in the next budgeting cycle. However, APM implementations require significant commitment from senior executives, and they also require a six-figure financial investment, dedicated staff, and will disrupt the status quo as they reset spending priorities. CIOs must build a compelling business case that details cost, benefit, flexibility, and risk to garner the support of executive management.

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Forrester interviewed Allen Systems Group, BluePhoenix Solutions, CAST, Compuware, HAL Knowledge Solutions, IBM, Information Balance, Metalex, and some companies in the early stages of implementing APM. We also drew data from Forrester's Business Technographics® November 2004 North American And European Benchmark Study.

Related Research Documents

“APM Tools Will Reach \$500 Million To \$700 Million By 2008”

July 22, 2005, Market Overview

“IIM's Dashboards Serve Many Constituents”

June 13, 2005, Trends

“Integrated IT Management Drives Efficiency”

February 2, 2005, Forrester Big Idea

IT MANAGEMENT CAN'T SEE ITS BIGGEST EXPENSES . . .

IT management is over-focused on improving the productivity of new development activities, even though the bulk of IT budgets — some 76% — will be spent to keep existing applications operational.¹ To the extent that IT departments can see, analyze, and optimize their maintenance spending, they have opportunities to reduce costs and redirect maintenance dollars into new development projects. CIOs need information about the activity in their departments to develop metrics that will guide more strategic allocation and consumption of IT resources. But they lack visibility into this activity today, and this can have adverse impacts:

- **High-expense applications escape scrutiny.** Without the detail, managers can't detect and correct out-of-control resource consumption, so costs spiral, bloating the application portfolio. Rogue projects become the norm, little or no money is allocated to retire applications, and waste proliferates.
- **Maintenance budgets are lumped together.** Companies tend to lump the budget for maintenance efforts together as a single, large, recurring expense item, eliminating the detail that IT management needs to spend maintenance resources in a way that mirrors the needs of the business. Without adequate cost accounting to guide resource consumption, political power and excessive complaining take over.
- **The perception is that the CIO can't manage total IT costs.** As a result of these factors, CIOs can't explain why maintenance costs are so high, which applications consume the most resources, and whether the spending patterns match the needs of the business. The business managers then see the CIO as a manager who is incapable of managing resources, and this dilutes the CIO's credibility on all fronts.

. . . BUT APM MAKES THOSE EXPENSES VISIBLE

APM is a new way to gain control of application maintenance expenses. It is rapidly gaining favor in the industries with the largest, oldest code bases: financial services, government, utilities, and telecommunications, to name a few. Why?

- **APM provides dashboard visibility into existing applications.** APM constructs a knowledge base about the existing, custom-built applications — those that consume the bulk of the maintenance resources — by reading source code artifacts, building relationships between those artifacts to enable impact analysis, and adding key business-oriented metrics on top of the knowledge base. Dashboard-level views of the metrics permit analyses of resource consumption, which encourage better overall resource management. The resource also acts as a knowledge reference, greatly mitigating the shortages of application-knowledgeable staff.
- **Savings from the earliest APM implementations are impressive.** Reports of complete ROI within 12 months and savings of 10%, 20%, and even 30% of the maintenance budget are

common. In fact, one company predicted that its future savings would eventually run as high as 40%. Finding companies with more granular and specific quantification of APM benefits has proved difficult, as the impetus for implementing APM was a wholesale lack of application metrics.

- **APM is a key component of IIM.** Integrated IT management (IIM) is a series of dashboard tools that companies such as Computer Associates, Compuware, IBM, Mercury Interactive, and a host of others are currently building to provide visibility across all of IT.² These IIM tools will consolidate views from APM, project portfolio management (PPM), and enterprise infrastructure management (EIM) into a single dashboard for IT management.³ Forrester believes that companies will evolve toward IIM in building-block fashion, implementing the tools in the order of where they experience the most pain. For many organizations, this means that APM will come first.

DEVELOP METRICS TO BUILD YOUR CASE FOR APM

The driving force behind APM is that we can't manage what we cannot see or measure. Maintenance consumes too much of the overall IT budget, but few companies know more than this fact, because they do not collect metrics about their existing applications. In fact, beyond a gross dollar figure — X% of the IT budget — most companies don't have the metrics to develop the baseline from which to measure improvement.

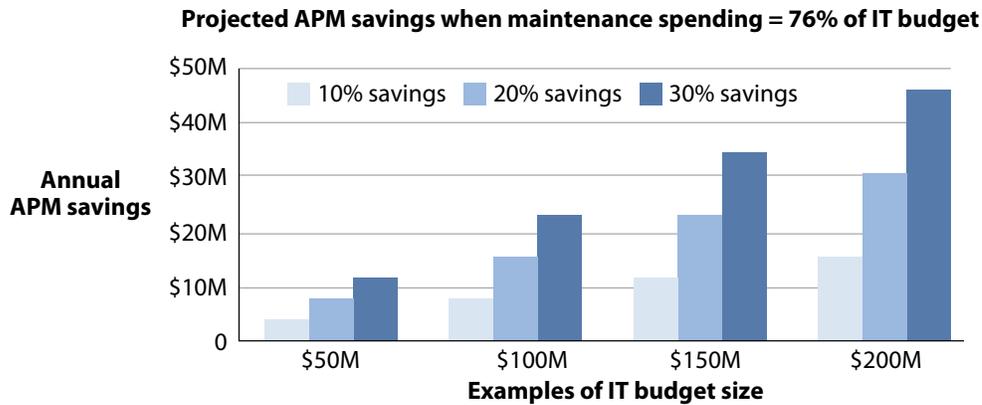
For some firms, improvement is enough, and proof is unnecessary. One organization interviewed by Forrester noted, "We did not bother to calculate ROI — the benefits are so obvious to everyone involved that we chose not to waste the effort on the calculations."

For other firms, justifying an APM implementation is necessary, and it requires factual or estimated figures on the current cost of keeping all existing applications operational, the cost to implement an APM solution, and an estimation of the expected savings.

Expect To Improve Programmer Productivity

The percentage of the IT budget that firms spend on application maintenance is widely believed to range from 60% to 80% and higher, although it varies considerably from firm to firm. Survey data from Forrester supports those beliefs. In a recent survey, executives estimated that in 2005, just 24% of their 2005 IT budgets will be spent on new development, implying that 76% will be spent on existing systems.⁴

Using 76% as the standard cost of maintenance across four sample IT budgets ranging from \$50 million to \$200 million, the annual impact of APM savings ranges from a few million dollars to nearly \$50 million (see Figure 1). Conservative analyses may use 10% as a potential savings estimate, but Forrester suggests that the middle of the range, 20%, is still a conservative number.

Figure 1 Projected APM Savings

Source: Forrester Research, Inc.

IT is rife with claims about productivity improvements. Some validation is available from the Software Productivity Research group, founded by Capers Jones, the father of function-point estimation techniques.⁵ The group notes some remarkable metrics about the impact of knowledge and tools on programmer productivity:

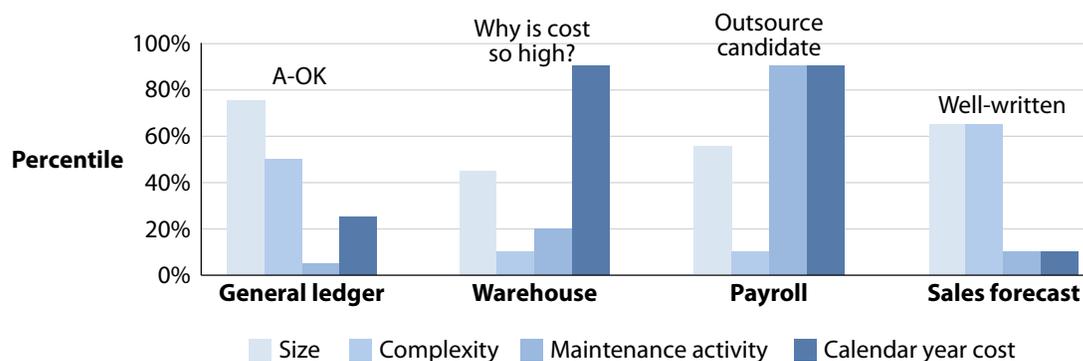
- **Application knowledge/experience is king.** Programmers with more than six months' experience on an application are as much as 34% more productive than the norm. Staff with no prior application experience can be as much as 40% less productive than the norm. Productivity benefits accrue to everyone who uses APM to understand the application before they scope a change to it: business analysts, systems analysts, programmers, and team leaders.
- **Impact analysis and search tools increase programmer productivity.** Programmers with search, impact analysis, and re-engineering tools are as much as 30% more productive than the norm.
- **Application complexity kills programmer productivity.** Organizations with highly complex code bases are as much as 30% less productive than those with average complexity. By giving programmers complexity analysis tools, it is possible to see an increase in productivity that is as high as 30%.
- **APM tools enhance programmer productivity.** Some of the features within APM tools can greatly improve programmer productivity during all maintenance efforts. Reaping only some of that benefit, it is reasonable to expect to see a 20% improvement in productivity. Note that programmer productivity benefits accrue every year.

Better Strategic Information Drives Better Decisions

The benefits that derive from more strategic views of application data will result in smarter overall application decisions. Phrased another way, avoiding a bad decision about investing in an application has the potential to save far more money than increased programmer productivity ever will. Forrester believes that these savings will eventually dwarf the more tactical programmer productivity increases.

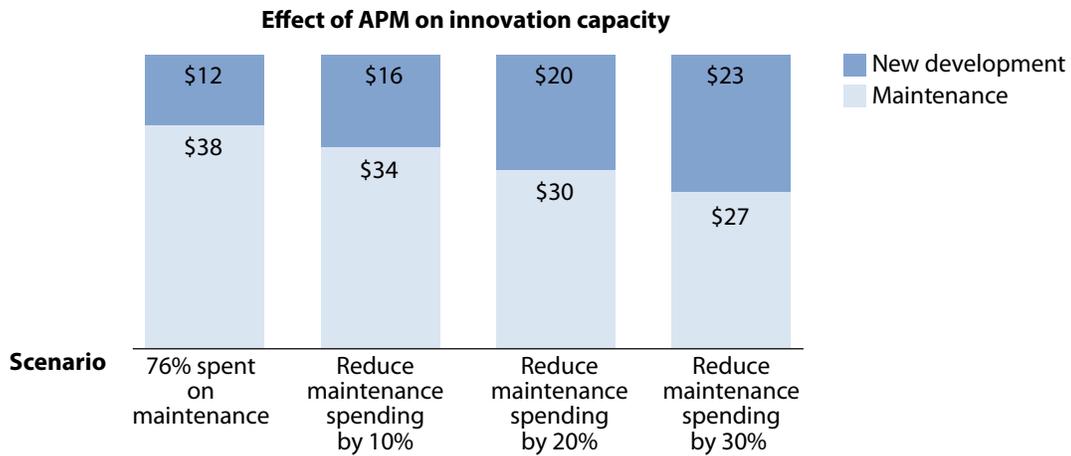
- **Some solutions are obvious, once you can see the problem.** Sometimes, simply visualizing a problem points to an obvious solution. One company that Forrester interviewed found 17 travel and expense applications during its initial inventory. The 17 systems served just 16 subsidiaries. In this case, a decision to centralize on one system would save the cost of 16.
- **Compound data analysis exposes patterns.** Although ranking all applications by cost, complexity, or size may be interesting, it isn't very informative. When two or more metrics are combined together in a view, however, issues are instantly recognizable (see Figure 2). Looking at a fictitious firm's portfolio, for example, it is obvious that the general ledger application is both complex and large, yet the activity against it and the resultant cost are moderate. The high cost and annual maintenance activity in the payroll application make it an obvious candidate for outsourcing. The very high cost on the moderately sized warehouse application, despite its low complexity and low maintenance activity, point to a personnel problem. However, the low cost and the repair ratio of the very complex sales forecast application prove that the company's first service-oriented architecture (SOA) application is paying dividends. APM's compound data views tell real stories of the value of APM.
- **Trending takes time but yields smarter application decisions.** The ability to evaluate trends that are hidden within detailed application information will yield much smarter overall decisions. Is a given metric (complexity, cost, or bug frequency) better or worse than last year? Why? To build enough historical data to compare this year with a previous year, firms must establish 18 to 24 months of data.

Figure 2 Views Of Compound Data Expose Issues



Source: Forrester Research, Inc.

Figure 3 Increasing Innovation Capacity



Source: Forrester Research, Inc.

Increase Your Innovation Capacity By 30% To 95%

Innovation capacity offers another vehicle that can be used to estimate the benefits that accrue via APM. Forrester introduced the concept of innovation capacity, which can be adapted to an APM business case formula. Innovation capacity is defined as:

*The amount of available funds that IT can spend on new initiatives in any given year — typically, total IT spending minus IT spending on ongoing operations and maintenance.*⁶

Organizations that employ APM have the opportunity to increase their innovation capacity. APM implementations that mirror reported savings of between 10% and 30% of the maintenance budget will cause innovation capacity to grow by 30% to 95% (see Figure 3).

ANALYZE COST/BENEFIT, ADDRESS RISKS, AND FAVOR FLEXIBLE OPTIONS

Forrester’s Total Economic Impact™ (TEI) methodology model bases decisions on cost, benefit, risk, and flexibility, ensuring a more complete effort than traditional cost/benefit or total cost of ownership models. Firms should include the following four aspects to ensure a complete business case.

Determine The Cost Of APM

The total tool cost for APM tools to date has ranged from deal sizes in the low six figures (\$150,000 to \$250,000) for a smaller implementation to \$1 million to \$1.5 million and more for the very largest organizations, with the average falling in the \$400,000 range but varying greatly by industry (see Figure 4). APM pricing varies significantly from vendor to vendor and falls into these models:

Figure 4 Average APM Deal Size By Industry

Industry	Average deal size
Business services	\$165,000
Financial services	\$558,567
Government	\$361,257
Insurance	\$209,533
Manufacturing	\$147,500
Media	\$141,000
Professional services	\$168,432
Public services	\$547,493
Retail	\$157,000
Telecommunications	\$345,748
Transportation & logistics	\$229,983
Other	\$105,626
Utilities	\$208,063
Total average	\$364,562

Source: Forrester Research, Inc.

- **Lines of code.** The cost of the APM tool is metered by lines of code, with steep breaks for very large code bases. This model is the most advantageous to small and medium-size businesses (SMBs), which don't pay high license fees for small implementations. It is also fair to larger companies that want to ramp up usage, because the pricing scales with their usage and reduces when their code volume reduces, as in a post-merger situation. HAL Knowledge Solutions uses this model.
- **Number of developers.** The cost of the APM tool is driven by the number of developers the organization employs. This model is more of a holdover from the days of application mining tools, where programmers were the only significant tool users. CAST uses this model.
- **Server.** The vendor's fee is based on the size of the server(s) under a perpetual license (initial fee plus maintenance) or a term fee (one- to three-year license). Metalex uses this model, and Information Balance uses a modified version that is tied to implementation fees.
- **User seat.** The cost is driven by the number of users (seats) — either named or concurrent. This is typically used by vendors as an add-on to one of the other pricing models for access to some of the role-based views of the tools, such as the managerial views.

Note that the implementation costs for an APM tool vary greatly, depending on how much of the work clients do, but it is safe to assume that consulting costs will range between 80% and 120% or more of the tool costs. Implementation costs include running all of the source code through the tool to build the repository. They may also include customization to link the APM knowledge base to the source code management system, collection of programmer labor, or collection of the system owner contact information to enable alignment of application costs to the business owners.

Assess The Risks Of APM

As with any project, many things can go wrong in an APM implementation. Firms should assess financial, political, or other forms of risk and consider how they will mitigate those risks.

- **The project will fail without executive sponsorship.** Trite as it may sound, any project can fail without the right level of sponsorship. However, APM affects the entire organization. The last software-related project of this magnitude that all companies faced was the year 2000 remediation effort. Get the support of the CEO, and drive it through the hierarchy to the lowest levels of the organization.
- **APM will fail to generate enough benefits if used on a subset of applications.** Some companies have failed to employ APM broadly enough. Gathering statistics for a handful of systems does not produce action-oriented results. APM seeks applications with anomalous characteristics, as compared with all others, and then provides the drill-down (all the way to the source code if necessary) to determine why. Knowing the costliest applications in a business unit doesn't provide a wide enough basis for establishing norms versus anomalies.
- **Internal passive resistance could doom APM efforts.** Cowboy coders may believe that they don't need to use the reference — they are smart enough to read the code and diagnose the problem without the help of a new tool. Others may fear redistribution of their precious IT resources. Some may simply resist change in any form. Passive resistance occurs most often when executives fail to provide vocal and visible support.
- **APM will fail in organizations with predominantly packaged applications.** As noted in recent research, APM does not serve packaged applications well.⁷ It operates on source code, and many application package vendors do not distribute source code. If you don't own (or don't change) source code for 60% of your applications because they are packages, then you should reduce the potential benefit calculation by 60%.
- **APM needs access to application source code to function.** It may seem obvious, but organizations that do not have the latest versions of their source code cannot implement APM for those systems. Source code decompilation services may be able to recover source code in these cases.
- **APM requires perseverance and personal courage.** APM is a road map of applications: What do you own, what activity do you perform against it, and what does it cost you? It won't provide any benefit if you fail to act on the findings or if management permits programmers to ignore the knowledge base as a reference when changing unfamiliar code. APM will create political ramifications. Courage is needed to dismantle traditional fiefdoms, but success demands it.

Flexibility Issues With APM

APM provides flexibility by increasing knowledge and permitting action without a lot of analysis paralysis. It has few opportunities to limit flexibility, but companies must be aware of the following:

- **Tightly coupled integrations will decrease flexibility.** APM will be hooked to the source code management (SCM) system to detect application changes as they are promoted to production. In most cases, that coupling is loose enough that it will not reduce the flexibility of choice in SCM packages. The implementation may also integrate labor tracking applications to enable cost estimations. Other integrations may include telephone contact numbers for system owners. For example, Merrill Lynch integrated its personnel directory to automate the lookup of the on-call resources when applications terminated abnormally. Any coupling with other systems should be loose to avoid future flexibility problems.
- **Vendors add new languages at different speeds.** If the vendor covers all of your required languages today, then the future risk is that you will adopt a programming language before the vendor does. The risk here is that applications written in the new language will not appear in your APM analyses until the vendor writes a parser for the language. As metadata gains a role in influencing application behavior, will the tool keep up with advances in technology?
- **An APM choice could lock firms into an IIM vendor choice.** This is a possibility, but IIM is a new and still developing market. Most of the vendors that are building an IIM solution still lack an APM vendor, so any vendor could be acquired. Ask about IIM strategies and alliances as you investigate APM vendors, but don't let it slow you down. You can't afford to wait, because the benefits that accrue with an APM solution far outweigh the risks, even if you have to replace the APM tool. As the APM market heats up, the vendors will offer knowledge base migrations as part of their competitive replacement programs, taking the sting out of the change from one APM vendor to the other.
- **APM increases a firm's IT agility and flexibility.** APM enables programmers to locate source code that is specific to functionality across the enterprise, enabling changes to be made far more rapidly than manual searching permits. The ability to act quickly — when regulatory mandates occur and when business strategy requires an immediate functional change — greatly increases an IT organization's flexibility in being able to respond.

Articulate The Benefits Of APM

The key part of making the business case for APM is to clearly articulate the benefits to the enterprise. Some of these benefits loom larger than others in the minds of individual CIOs, as driven by their particular circumstances. Seeing and reducing maintenance costs and the ensuing ability to rebalance the portfolio spending will be the top benefit for most organizations, as:

- **APM enables steep reductions in maintenance costs.** A number of sub-benefits accrue to make these 10% to 30% savings possible. APM speeds the finding and fixing of bugs, speeds the completion of enhancements and compliance projects, mitigates waning application knowledge due to staff retirement and turnover, and demystifies applications written in distributed languages like VB, C, C++, C#, and Java.
- **APM exposes unfair or disproportionate allocation of IT resources for maintenance.** When maintenance is managed as a single budgetary item, business managers fight for all they can get from the pool of available resources. Often, resources go to the politically powerful or to those who complain the loudest, not necessarily where they are needed most. APM exposes the facts about who is consuming what. With evidence, those who were shorted have proof. The CIO and VP levels need balanced spending according to business priorities; they have just never had a way to prove that it was happening. APM sheds light on what is, and it permits reallocation to what should be.
- **APM aids application rationalization in the face of merger and acquisition activity.** If aging systems are a problem in each firm's IT organization, then merger activity doubles or triples the problem. Post-merger application support cost projections, in fact, can be the catalyst to justify the acquisition of APM software.
- **APM helps to assess the quality of code developed by outsourcers, as well as SLA achievement.** IT organizations can measure the quality and complexity of source code before accepting it from offshore developers. In outsourced situations, APM provides a monitoring agent to establish and measure SLA achievement.
- **APM allows firms to articulate IT maintenance spending and improve business relationships.** Forrester believes that the true value of APM is in the way that it changes IT's ability to manage itself, based on specific costs and visibility to activity. This visibility enables IT to communicate true costs back to the business application owners in a language they understand. The common language promotes understanding, which in turn will have a positive impact on IT's relationship with the business.
- **APM improves the ability to monitor IT-related risk management concerns.** Risk management officers who are looking to assess the corporation's exposure to a certain technology or regulatory mandate may use APM to determine where exposure exists within applications and the cost of mitigating exposure. These risks may include unauthorized insertions of code that enable identity theft, reduce data privacy, increase audit exposure, and hinder compliance with regulatory mandates. For example, corporations can use APM to assert that security officers have scanned outsourcers' inbound code, looking for hidden software bombs triggered to activate on a certain date.

- **APM is integral to IIM, which will reshape IT management.** Forrester believes that IIM is the future of IT management, based on its potential to bring visibility to all facets of IT activities and costs. APM supplies the application visibility that IIM needs to improve cross-enterprise IT management.

PACKAGE AND PRESENT THE RESULTS FOR APM SUCCESS

Size matters when it comes to APM: The larger the IT organization and the higher the percentage of custom-developed applications, the greater the likelihood that APM is a good fit. Some of the vendors have tools to estimate the potential savings based on customer inputs such as budget size and staff counts, although critics may doubt the objectivity of their tools. If you use a method internally that is widely accepted, then a report in that format may be more readily accepted than introducing a new format. In lieu of a preferred method for proposal format, and because it also considers risk and flexibility, Forrester’s TEI methodology offers customers a way to quantify the pros and cons of proposals beyond the normal cost/benefit and TCO methods (see Figure 5).

Figure 5 TEI Formula — Cost, Benefit, Risk, And Flexibility

Total Economic Impact = Benefits minus costs tempered by flexibility and risk

Do the benefits substantially exceed the projected costs?	Benefits <ul style="list-style-type: none"> • Productivity gains • M&A rationalization • Improved relationships • Outsourcer evaluations • Risk management monitoring • IIM enabling 	Costs <ul style="list-style-type: none"> • Tool acquisition • Education • Maintenance percent • Implementation (estimate 1X tool cost) • Integration • Program office staff 	Are the estimates: <ul style="list-style-type: none"> • Conservative? • Realistic? • Reflective of your environment?
Can you really avoid these risks?	Risks <ul style="list-style-type: none"> • Weak sponsorship • Small scope • Passive resistance • Packaged applications • Missing source code • Lack of fortitude 	Flexibility <ul style="list-style-type: none"> • Loosely coupled integration • Vendor agility (new language adoption) • IIM vendor independence 	Can you ensure this level of flexibility?

Source: Forrester Research, Inc.

RECOMMENDATIONS

RATIONALIZE YOUR APPLICATION SPENDING

In the late 1990s, CIOs avoided investments in legacy systems because the mainframe was being replaced. In 2000, the recent Y2K investments made migration unthinkable. In the early 2000s, the Internet craze kept our attention elsewhere. In 2005, most companies are finally admitting that their legacy environments will be with them for a decade or more. So APM will help make sense of the chaos that plagues most IT organizations. This is as true for 5-year-old C, C++, and VB environments as it is for 30-year-old mainframe COBOL environments.

- **Focus on internally developed applications.** APM's goal is to bring order and metrics to the maintenance efforts of internally developed/maintained applications, where labor costs soar unchecked. APM does not replace IT asset management of commercial, off-the-shelf solutions (COTS), nor does it serve packaged applications particularly well.
- **Build a thorough, conservative case for change.** Develop as many factual numbers as possible from current and past IT budgets. Estimate the figures that are missing. In cases where a range of numbers is available, such as the reported savings from using APM, note the availability of the range but use the conservative end of it. Vet the estimates with critics and allies alike; their arguments will only strengthen your case. Gather actual cost estimates from multiple vendors. Use the average deal size by industry sparingly. With slightly less than 100 participants in the survey, some industries have only one or two entrants — too few on which to rely. Also note that the average deal sizes do not include customization and implementation.
- **Drive APM initiatives through the office of the CIO.** Since APM is a cross-organizational effort, it belongs in a program office or the office of the CIO, if one exists.⁸ Divisional and departmental efforts will be too narrow in scope to provide sufficient benefit, except in multinational conglomerates. In these cases, it may make sense to mirror the IT governance hierarchy. However it is organized, APM needs powerful sponsors and a champion to provide constant and vocal communication of progress and success. This is a wholesale process improvement program for IT, so you should treat it as though it is critically important to the success of your organization — or risk failure.
- **Plan ahead for implementation.** Locate your source code and make sure you have it for all production systems. If you don't currently collect programmer labor at the artifact level, then that is one cultural change that could be troublesome. Communicate why accuracy in recording labor is so important. Build a small table that links the application-owner contact information to the application in the knowledge base, and establish the ownership of each application, realizing that some will be owned by the corporation and not by a business unit.
- **Identify the stakeholders who can make change happen.** Beyond application owners, there are stakeholders within the organization who have the responsibility and authority

to make things happen. For example, an application owner may demand level funding of maintenance for a given application, even though higher-priority application maintenance tasks that belong to other managers go unfunded. The vice president of the division — to whom both managers report — has the power to create compromise in the interest of the business. These stakeholders are more important in many respects than the system owners.⁹

WHAT IT MEANS

MAKE THE EFFORT — BEFORE SOMEONE ELSE DOES

As APM and IIM adoption becomes more widespread, the publicity will encourage more business peers and CIOs to investigate these IT dashboards for the visibility they bring to IT. With APM implemented:

- **CIOs will run IT more like a business.** The days when IT could operate in isolation from the business are waning, if not completely gone. If CIOs want a seat at the executive meeting table, then they must demonstrate mastery of the resources under their control, and they must prove that they can harness those resources to the benefit of business strategy.
- **APM successes create fuel for the IT marketing machine.** The savings that result from dashboard implementations need to be publicized. Sharing the good news about IT's contribution to the bottom line is critical to enable CIOs to move from being a cost center manager to a strategic partner and contributor to innovation. By creating visibility and marketing successes and by helping to fold savings into innovation initiatives, IT will create long-sought business value.¹⁰
- **Firms double their innovation capacity.** The money wasted on duplicate applications and enhancements that should never have been approved can finally be seen. With the realization of poor financial management, along with the detail to see exactly what, when, and who, comes a redirection of spending from unproductive waste to a near-doubling of the firm's innovation capacity. It can also result in a significant return of budget money back to the business' coffers for redistribution into non-IT endeavors.

SUPPLEMENTAL MATERIAL**Companies Interviewed For This Document**

Allen Systems Group	HAL Knowledge Solutions
BluePhoenix Solutions	IBM
CAST	Information Balance
Compuware	Metallet

ENDNOTES

- ¹ On average, 76% of firms' IT budgets go to ongoing operations and maintenance, as opposed to new investments. See the December 15, 2004, Data Overview "2005 Enterprise IT Outlook: Business Technographics North America."
- ² Visibility across the enterprise into IT activity, resource availability, allocation, and consumption is badly needed in IT today, but given the percentage of IT budgets that it consumes, maintenance is the most sensible place to begin for many companies. Forrester sees several nascent dashboard tools coalescing into integrated IT management, which will provide cross-enterprise visibility. See the February 2, 2005, Forrester Big Idea "Integrated IT Management Drives Efficiency."
- ³ APM focuses on existing applications, whereas PPM focuses on new projects, and enterprise infrastructure management (EIM) concerns itself with infrastructure and runtime information.
- ⁴ Source: Forrester's Business Technographics November 2004 North American And European Benchmark Study.
- ⁵ Capers Jones is widely recognized as the father of function-point estimation techniques, and through his Software Productivity Research foundation, he has published a number of tomes on software estimation and quality. For more information see Capers Jones, "The Economics Of Software Maintenance In The Twenty-First Century," Software Productivity Research, January 27, 1999 (<http://www.spr.com/news/SoftwareProjectArticle.pdf>).
- ⁶ Previous Forrester research introduces the concept that a company's capacity for innovation is the difference between its total IT budget and the amount of money it spends to keep existing applications running. APM is one vehicle that can help organizations significantly increase their innovation capacity. See the August 3, 2005, Best Practices "Memo To CEOs And CIOs: IT Innovation Capacity — Not IT Spend — Is What Matters."
- ⁷ Although the situation is improving, at the beginning of 2005, APM vendors supported no packaged application languages. See the August 8, 2005, Quick Take "Packaged Applications Are Poorly Served By APM."
- ⁸ Cross-enterprise efforts like APM need the power and autonomy that come with executive support. Whenever possible, house them within a program management office or the office of the CIO. See the September 22, 2005, Trends "Taking Your PMO To The Next Step: The Office Of The CIO."

- ⁹ Dashboards show business activity, both good and bad. When issues arise that need corrective action, knowing the stakeholders will ensure that a minimum of delay occurs prior to corrective action. See the December 17, 2003, Report “Making Dashboards Actionable.”
- ¹⁰ CIOs are turning to unconventional methods to get IT the recognition it deserves, and some are even turning to marketing techniques. See the August 23, 2005, Best Practices “The Marketing Of IT.”

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