

***Clearing the Bottlenecks:  
Cognizant's  
Application Management Solutions  
White Paper***



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## Introduction

E business is just one of many challenges and opportunities impacting the global marketplace today. Mergers and acquisitions, business process reengineering, and the push to rationalize supply chains and improve customer relationships are placing renewed push on IT organizations to deliver new systems to support dynamic organization structures, staff roles, business processes, customer services, and strategic partnerships.

The result is that IT organizations are being pushed like never before to innovate new technologies at “Internet speeds,” which call for projects to be delivered in days or weeks, not months or years.

Yet, no organization can afford to sacrifice routine application maintenance and application enhancement in order to accelerate the rollout of new systems. Recent Y2K compliance issues have taught IT groups that successful enterprises cannot take their back end systems for granted. Most enterprises will rely for years to come on legacy systems to power their competitive strategies, regardless of whether they are “brick and mortar” or “click and mortar” businesses.

The bottom line? Behind every successful “hot” IT innovation are current, well-maintained transaction and business intelligence systems.

### **TODAY S IT ORGANIZATION: DOING MORE WITH LESS**

Because information technology is increasingly at the heart of enterprise competitive advantage, the demand for IT professionals across the globe is fast outpacing the supply. Consequently, as demands on IT organizations intensify, recruiting professionals—or simply retaining them—is proving an uphill battle.

IT organizations require solutions that help them cope with the rigors of competition in an increasingly complex business world. They require application management strategies to cope with the growing demands to do more with less.

Cognizant Technology Solutions' *Application Management Solution* is designed to provide a comprehensive solution to enterprise application maintenance for organizations striving to compete in a world of e business and tight labor markets. AMS addresses all the key issues, balancing cost, complexity, and capacity for all areas of the application lifecycle, from development or enhancements to everyday maintenance or support. Cognizant offers a service-oriented strategy that allows enterprise IT organizations to decide how—and where—to effectively focus their limited resources without compromising their competitiveness. With AMS, IT organizations can firmly gain control of systems development and maintenance challenges while mastering the rollout of new systems at Internet speed.

## Cognizant AMS Overcomes Application Maintenance Constraints

ISSUE	INTERNAL STAFFING	THE COGNIZANT AMS ADVANTAGE
<b>Resource Allocation Issues</b>	Tug of war between innovation and maintenance often distracts IT management and degrades performance.	Cognizant AMS provides resources to offload non-strategic tasks, while advanced tools provide the means for managing maintenance resources efficiently
	Corporate IT groups today are playing central roles in building competitive advantage	Use of Cognizant resources frees up internal staff to focus on strategic projects, including development of new innovative applications
	Legacy applications continue to require support	Routine maintenance is efficiently performed at any one of Cognizant's seven development centers in India
	Maintenance activities are time consuming, labor intensive, and difficult to manage.	Maintenance requests evaluated and delegated to most appropriate resources
	Maintenance overload often leads to crisis management	Cognizant on-site AMS teams manage user support requests requiring immediate response Cognizant offshore AMS teams manage escalated jobs
<b>Mgmt. Issues</b>	Staff turnover jeopardizes IT ability to maintain existing systems	Knowledge Repository ensures that the process is repeatable, reliable, and less impacted by staffing changes
	Most IT organizations lack processes and tools to ensure high-quality maintenance	Routine quality assurance testing and tracking checks effectiveness and efficiency of AMS solutions
	Existing service level management processes and measurement tools inadequate or non-existent	Tool based metrics reporting proactively track AMS team performance and service level compliance
<b>Cost Issues</b>	IT labor shortages drive up salary levels, forcing many companies to either prioritize maintenance vs. new development, or reduce service levels.	AMS leverages savings derived from offshore maintenance entails without compromising service levels
	Lack of advanced maintenance tools and current techniques results in poor IT staff utilization	Cognizant metrics cockpit and reporting tools regularly track service request status, service efficiency, service level compliance, and staff utilization
		Cognizant closely coordinates activities of on-site and offshore teams, based on nature of problem, complexity, severity, and resolution deadline
<b>Service Quality</b>	Staff shortages and turnover adversely impact knowledge levels and the ability to execute	Cognizant teams improve code base quality and maintenance
	Popularity of new technologies (e.g., Java) often results in shortage of professionals with legacy system skills	Root cause analysis and code restructuring allow maintenance to grow more efficient over time

## Overview: The Cognizant AMS Solution

AMS streamlines application maintenance, through a proven systematic approach to improving service reliability, maintenance responsiveness, and application quality. Cognizant developed AMS based on its extensive experience serving the application maintenance needs of leading global enterprises.

The Cognizant AMS strategy is based on:

- **Flexible Service Delivery.** AMS services can be tailored to the customer's needs. For instance, the customer can outsource the entire application maintenance activity.
- **Phased Approach.** Cognizant has developed a standard approach to the application maintenance life cycle to ensure that application maintenance responsibilities are transferred from internal staff, rapidly and consistently. Teams are dedicated to performing specific functions, ranging from project planning and knowledge transfer to application support.
- **Quick Transition:** Cognizant emphasizes rapid transitions of responsibilities to keep projects on track and within scope. Each phase of the transition process is implemented within a strict timeline, ensuring that handover of most or all application maintenance responsibilities are complete within 60 – 90 days.
- **Value Addition:** Cognizant doesn't simply maintain customer systems, it improves them. The AMS solution *adds value* to legacy systems in numerous ways. For instance, Cognizant documents all systems; for many customers, this may be the first time that their applications are fully documented. Additionally, Cognizant's root cause analysis processes, a foundation of the AMS service, improves the reliability and robustness of systems because future bugs or performance problems can often be prevented before they emerge.
- **ISO-certified Quality Assurance Practices.** Cognizant's QA practices are world-class. Cognizant has been ISO *certified* and has been assessed at **Managed Level 4 of the SEI/CMM model**. For the customer, this means that Cognizant's AMS solution is built on managed, carefully documented, repeatable processes, which undergo periodic spot checks to ensure that quality remains consistent.
- **Team Coordination.** Cognizant teams approach every problem flexibly. An on-site team is permanently deployed to lead the engagement and resolve all problems requiring rapid, same-day turnaround. Cognizant's on-site team works closely with offshore teams in India regarding all ongoing maintenance and service requests. Standard procedures are used for managing and escalating all service requests.
- **Comprehensive Toolsets.** Cognizant supplements its certified processes with analytical and reporting tools that document all aspects of application maintenance. A "Metrics Cockpit" provides management views of Cognizant's performance using easy-to-understand, visual dashboards. Additional tools track service level compliance, with the capability to drill down to project or task level. Managers can track performance by task category or individual task. They can also track staffing effectiveness by group, location, or task type, or examine the process to identify which activity areas are most prone to bottlenecks or software defects.
- **Metrics-based Performance Management.** Cognizant manages performance using standard metrics for quality, productivity and process effectiveness that are communicated through scheduled reports, weekly teleconferences, videoconferences, or other means.

## What Does AMS Cover?

Application maintenance consists of several distinct activities. Cognizant's AMS solution provides all the necessary levels of application support.

### **Production (Level One) Support**

AMS Level One Support answers routine "how-to" questions on system functionality. First-level AMS support teams document problems and fix minor problems such as memory or disk space limitations, and common application issues.

### **BUG FIXES**

Serious problems requiring root cause analyses are handled by Cognizant offshore teams. The team conducts in-depth analyses to develop long-term bug fixes. Team members are chosen for their ability to gauge the overall impacts of bug fixes on the rest of the system and all other related components.

### **ENHANCEMENTS**

Because legacy systems continue playing mission-critical roles, they must be enhanced on an ongoing basis to meet changing business requirements. Cognizant's strategy is to deliver enhancements by extending the existing code.

## Change Management

People are at the heart of any application maintenance transition strategy. When transferring responsibilities to external teams, change management practices are absolutely necessary to keep the process running smoothly. Most importantly, when any change happens, people must be kept fully informed.

Based on its long experience in handling outsourcing transition, Cognizant has designed a Change Management Program to help customers manage all key maintenance and staffing issues. The program addresses downsizing issues, staff retention, and steps for managing the transition of responsibilities.

Because communications must be at the heart of any transition process, Cognizant helps customers design communication programs that keeps IT staffs in the loop. The goals include clearly informing staff members on what is happening, and communicating key messages regarding employment continuity, job transitions, and career development issues. Additionally, the program is designed to outline all expectations about the results of the process and integrate all best practices into the new process.

## How Is AMS Delivered?

Because no two enterprises are alike, application maintenance needs must be specially tailored to the needs of the customer. For instance, some organizations face competitive issues that may be unique to their vertical industry, while others are coping with business restructuring, merger, or acquisition. Furthermore, the availability of the right IT skillsets often varies by region.

Cognizant offers a choice of application maintenance solutions to provide a tight fit to the needs of the enterprise.

### **TOTAL OUTSOURCING MODEL**

Cognizant assumes full responsibility for maintaining all application systems. AMS teams handle all tasks, from analyzing to fixing reported problems, and migrating the renovated source code into production. If necessary, Cognizant will hire customer staff for handling issues requiring specialized system knowledge or domain expertise.

Most importantly, Cognizant's total outsourcing model can eliminate the guesswork for IT budgeting, by offering fixed-bid, service-level pricing packages.

### **APPLICATION OUTSOURCING MODEL**

Outsourcing is limited to specified applications. This approach is especially useful for organizations that wish to shift internal staff toward other higher-priority applications or new development projects. Under this arrangement, Cognizant and the customer assume joint responsibility for application maintenance. Fixed-bid, service level pricing is also available to simplify budgeting.

## **Phased Transition Approach**

Cognizant uses a three-phase structured process for transfer application maintenance from internal staff to AMS teams. Each phase specifies the necessary tasks to accomplish an orderly transition. Besides specifying the type of management solution and scope, the documentation that is generated as part of the AMS transition process often helps customers improve their understanding of their own systems.

The first two phases—Planning and Knowledge Management—cover the actual preparation for transition, with the Service phase beginning once all systems and processes are in place. In most cases, the transition phase should not extend past 90 days.

In this section, we discuss how the AMS phased approach works.

### **PHASE 1: PLANNING**

<i>Typical Duration</i>	<b>2 weeks</b>
<i>Cognizant Resources</i>	<b>Account Manager Onsite Coordinator Offshore Project Leader Delivery Manager</b>
<i>Customer Resources</i>	<b>Application Managers</b>

The planning phase includes three major activities. It begins with a *Requirements Study* that documents what the customer needs, and how those needs can be addressed. The study identifies the context of the project, specifying the scope of work and the computing environment

in which the applications operate. Then, the AMS team translates these needs into infrastructure requirements, work plans, and service level agreements.

With the requirements defined, the next step is *Project Planning*. This specifies the details of how the project requirements are to be implemented, specifying all systems and subsystems, support levels, work definitions, documentation standards, and identifying which applications are business-critical. Additionally, a detailed process document outlines the customer's procedures and standards, and the quality control checks and project reports which should accompany them.

Based on planning input, the customer chooses the best outsourcing option (e.g., whether to outsource all application maintenance or employ a more selective approach). In turn, Cognizant then provides a cost estimate for the project. The process is generally completed within two weeks.

## **PHASE 2: KNOWLEDGE TRANSFER**

<i>Typical Duration</i>	<b>4 weeks</b>
<i>Cognizant Resources</i>	<b>Onsite Coordinator Offshore Project leader Onsite Team</b>
<i>Customer Resources</i>	<b>Technical Experts Subject Matter Experts End Users</b>

This is the stage where Cognizant deploys teams on-site to learn about the customer's computing environment, the applications to be outsourced, and existing maintenance procedures. In many cases, Cognizant's knowledge gathering often helps customers learn more about their systems. In most cases, this stage requires four weeks.

Cognizant teams use a variety of approaches for building their knowledge base, including interviews, discussions, side-by-side project work, and in some cases, questionnaires. Cognizant teams assemble what they have learned into a Knowledge Repository, the tool which provides the roadmap for the AMS solution, the offshore transition plan, and the reference point for documenting the system. For many customers, the result is that the systems and applications are often fully documented for the first time.

The Knowledge Transfer stage is carefully structured around four subtasks, around which the outsourcing strategy is developed; they include:

- *Technical Environment Study.* AMS teams study and document the system environment, comprising factors such as user profiles, transaction volumes, batch windows, available testbeds, security and access control procedures, maintenance practices, error resolution processes, and training requirements.
- *Application Understanding.* AMS teams learn the functionality of the application(s), and prioritize applications based on the level of business-criticality to the customer. AMS teams closely analyze the system, mapping business functions to programs and data sources, generating process flows, documenting user profiles, and studying error history to identify key system problem areas,. If no documentation exists, the AMS team will write it.
- *Maintenance Process Study.* AMS teams learn and document the processes triggered by error reports or enhancement requests, tracking all events through the entire fix/develop life cycle, identifying all tools used, and learning the customer's change control procedures and error classification schemes. Leveraging Cognizant's long experience in delivering application maintenance solutions, the AMS team will then write a maintenance plan that fits the customer's requirements.
- *Offshore Transition Planning.* The final deliverable involves conducting a gap analysis to identify areas requiring future work (e.g., incomplete or missing documentation, or the need for additional tools or training), beginning the handing over of maintenance responsibilities to Cognizant's on-site team, and the transferring of knowledge to offshore staff. At this point, Cognizant's on-site team gradually assume responsibility for maintenance tasks such as end user support, bug fixes, and enhancements under the customer's guidance. At the end of the transition, maintenance methodologies and operational guidelines are fully documented, and the first version of the Knowledge Repository is completed.

Cognizant prepares a comprehensive Knowledge Repository that provides a roadmap on how to maintain the customer's application.

		Knowledge Repository				
		Process	Application Level	Program Level	Database Level	Modification Record
Technical Environment Study		Standards Methodology Metrics Tools Training	Job Flow Transaction Flow Screen Flow Interface	Inventory XREF Info <ul style="list-style-type: none"> <li>• Program Copy</li> <li>• Program File</li> <li>• Program Job</li> <li>• Program Transaction</li> <li>• Program Comments</li> </ul>	Data Dictionary File Job XREF File Copybook XREF	
			Overview FAQ Process Model		Database Model	Diagnosis
Maintenance Process Study		Standards Methodology Metrics Tools Training				

## **PHASE 3: SERVICE**

At the end of week 6, the stage is set to transfer application maintenance responsibilities to the Cognizant on-site and offshore AMS teams. The Service Phase is the ramp-up to offshore application maintenance. This period should take no more than six weeks.

At the beginning of the process, the on-site AMS team splits up. The portion of the team that remains on site takes the lead for all maintenance activities. The other half of the team returns to the offshore development centers, where they transfer the knowledge that they have learned on site. As offshore staff grows more familiar with the customer's requirements, applications, and systems, they gradually phase in their involvement. By the end of 90 days, Cognizant's AMS teams assume full responsibility, fully taking charge of all application maintenance or focusing only on specific applications—depending on what level of outsourcing the customer has ordered.

## **Going Live**

The AMS solution provides comprehensive application maintenance support, encompassing production support and bug fixes, round-the-clock support, code enhancements, performance monitoring, and quality improvement. It takes advantage of Cognizant's dual-deployment approach, using on-site teams for project management, requirements analysis, and the resolution of problems requiring immediate attention. Meanwhile, offshore resources focus on code analysis, testing and QA, documentation, and developing program enhancements and permanent fixes.

Cognizant backs its service with a full set of process tools to help manage all phases of the application maintenance life cycle, from code analysis and data conversion to change tracking, testing, performance monitoring, and source code management.

### **Cognizant backs AMS with analytical tools for project reporting, and functional tools that automate major maintenance processes.**

<b>Tool</b>	<b>Task</b>	<b>Description</b>
Change Management (CMT)	Track Change	Tracks the progress of maintenance requests and stores details of all changes performed.
Change Management (OWL)	Job Failure Alerting	Automatically notifies AMS teams of job failures and logs all trouble calls
Metrics Cockpit	Performance Monitoring	Cognizant-developed tool that graphically displays key service level metrics
X-REF	Analyze Impact of Changes	Cross references source code details
Language Analyzer	Program Understanding	Analyzes source code to generate documentation and program flow diagrams
WorkBench	Code Change	
Test Coverage Analyzer	Testing and Debugging	Cognizant-developed tool that analyzes program execution paths for test coverage
E-Review/Standards Auditor	Quality Inspection	Internal project management tool for AMS staff to ensure all deliverables are completed
Data Converter	File Transformation	Converts data to new file and data structure formats
CMT/ Infoman	Source Management	

## **PRODUCTION SUPPORT**

A key advantage of AMS is 24-hour support. On-site and offshore teams are coordinated to provide full round-the-clock coverage, fully taking advantage of the 12+ hour time differences. For instance, on-site teams will handle production support during normal working hours at the customer's site. They can also resolve problems requiring immediate attention with workarounds during the day. Meanwhile, offshore resources handle production support at all other hours, and are perform the bulk of the maintenance, including code enhancements, in-depth code analyses, long-term fixes to software problems, and documentation writing.

Cognizant teams schedule an overlapping period at the end of the customer's workday, when the offshore teams start their shift. This period ensures continuity and the smooth handoff of work between on-site and offshore teams. Cognizant's on-site project manager determines which work is performed on-site or offshore.

## **CODE ENHANCEMENT/REPAIR**

A carefully structured process is used for performing code enhancements. For instance, Cognizant teams carefully validate all project estimate and analyze the impact of the enhancements before coding begins. While code is being written, Cognizant uses configuration management techniques to track and control all software versions, and synchronize code updates when multiple programmer teams are involved. Once the code is written, it undergoes a stringent QA process that includes a complete test and verification cycle before the enhancements are released to production. If any faults are identified during QA, strict Change Request processes are used for investigating the cause of the fault, tracking the fix, and ensuring that the fix is implemented in all affected portions of the program.

Cognizant's QA methodology is built around several key elements, including:

- *Documentaiton*. Every maintenance project is fully documented. This is required for AMS teams to understand the applications that they support; customers benefit in gaining a reliable, updated reference source about their systems.
- *Root Cause Analysis*. Cognizant performs root cause analysis for all recurring problems. These problems are identified as part of *regular reviews* to analyze trends in system use and trouble ticket reports. AMS teams will provide long-term solutions to recurring problems to improve system reliability.
- *Performance Tuning*. This is performed on a regular basis. Cognizant constantly documents, tests, and corrects bottlenecks to maintain promised service levels.
- *Restructuring Code*. Because most legacy systems have been heavily modified over the years, the result often consist of numerous ad hoc code patches. Based on its experience maintaining these systems, Cognizant can rewrite portions of these systems to improve their structure, efficiency, and maintainability.
- *Knowledge Repository*. A storehouse of meta data, the repository provides information related to the process, application, program, databases, and all changes that are made to the system. The repository is extensively cross referenced to help locate information.

## **PERFORMANCE MONITORING**

Cognizant believes that performance measurement is a key aspect of all maintenance projects—and that customers should always have full access, not only to the status of their outsourced systems, but data on how well the AMS teams are performing.

Cognizant has developed The Metrics Cockpit to provide key data using preconfigured process views and graphical reports of maintenance projects. For instance, they provide quick data on

project status and how fast progress is being made, trend analyses that compare current performance over time against past performance and general industry norms, and identify areas for improvement.

Although the Metrics Cockpit provides the reporting engine and report templates, the actual metrics are jointly determined by AMS teams and the customer to provide relevant data.

The variables tracked by the Metrics Cockpit include:

- Error Categories: Level of severity of the error, and the the priority for fixing it.
- Change Requests: Are change request schedules being met? Are the changes in turn generating further defects in the system?
- Service Level Agreement Performance: What is the incidence of problems, and how long does it take to complete the repairs?

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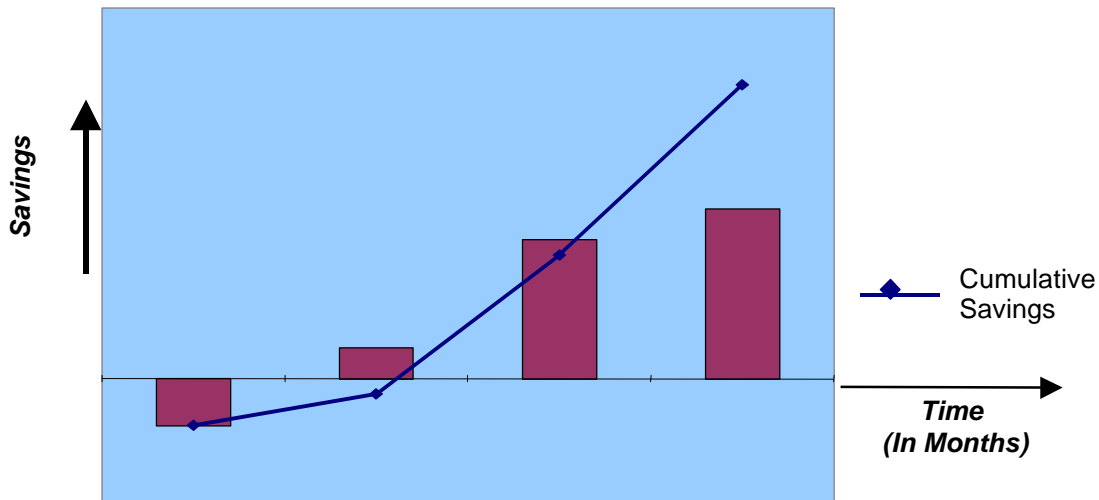
**Cognizant’s Metrics Cockpit is used for tracking how well AMS teams meet customer service level requirements.**

Category	Metric/Description
Maintenance Requests	Quantity received, categorized by status (open, work-in-progress, active, review, etc.) Percentage that are met within the agreed upon service levels. Percentage that did not meet the service levels, and the reasons why Percentage that required rework, indicating the accuracy of the correction Age Analysis, tracking cycle time to resolution
Activity Analysis	Time spent by AMS team members in various activities (e.g., fixes, enhancements, root cause analysis, documentation, training, etc.)
Root Cause Analyses	Number of fixes were uncovered from root cause analysis and the number of these fixes implemented
Enhancements	Accuracy of changes (by tracking customer-reported defect rates) Number of requests completed within the estimated time and effort (and analysis of those that were not resolved on time)
Response Time	Average response time for solving maintenance requests by error category. Average staff/hour Effort required

## The Bottom Line

### Charting the savings with AMS

After the 90-day transition period, customers save money as they take advantage of Cognizant's expertise, economies of scale, and economical offshore IT professional payscales. The fixed savings over the life of contract is 30% or more relative to internal cost.



### THE SAVINGS

AMS reduces direct costs for application maintenance by shifting activities to lower-cost offshore resources provided by Cognizant's seven Indian development centers. Additionally, by thoroughly documenting the systems (in many cases, for the first time), Cognizant delivers long-term operational savings by making maintenance more systematic, rather than intuitive.

The savings can be dramatic. Using the Cognizant AMS methodology and solution, most start-up costs are concentrated during the first 90 days and paid back in less than one year. In the long run, Cognizant customers have reported their overall application maintenance costs dropping by up to 60%.

### THE SERVICE

With Cognizant's systematic AMS solution, many customers report that application reliability dramatically improves compared to running applications internally. With the Cognizant AMS advantage, customers gain the services of a world-class IT organization, whose processes have been certified by ISO and the software Engineering Institute.

With Cognizant's world-class AMS teams assuming responsibility for application maintenance staffing headaches are eliminated. With Cognizant's service level guarantees spelled out and formally tracked, customers are assured that their applications will consistently perform. And, with Cognizant's fixed-pricing options, customers can tame often unpredictable IT budgets.

The result is that customers can redeploy their IT organization to develop new solutions to help them compete in 21<sup>st</sup> century markets, while maintenance of core legacy systems is assured. In rapidly changing competitive environments, your enterprise cannot afford any less.