

Quantifying the Value of Remote Maintenance

An Analysis of Customer Outage Data

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Section 1. Introduction

1.1 Executive Summary

Avaya Global Services helps ensure optimal communications solution performance through a wide array of maintenance services and managed options that provide unparalleled availability for critical systems. Avaya communications platforms and applications with their industry-leading hardware and software reliability and high availability provide a critical base for communications solutions performance. A key differentiator of Avaya Maintenance Services is the ability to remotely monitor and maintain a customer’s voice network through product alarms. Using a combination of Avaya EXPERT SystemsSM Diagnostic Tools, intervention, and resolution by remote technicians and engineers, Avaya resolves 99% of alarms on Avaya DEFINITY[®] Servers, Avaya Communication Manager, Call Center and Messaging Solutions remotely and begins diagnosing the problem within 90 seconds of receiving the alarm notification. The remaining 1% of alarms are resolved through an on-site technician visit.

Remote monitoring, diagnostics, and maintenance are largely invisible, occurring “behind the scenes,” and may be unappreciated by some customers. By contrast, if a customer reports a problem or a field technician is dispatched to the customer site, then we can say that an interaction took place between the customer and Avaya. The value of face-to-face service can be measured through response time metrics and customer satisfaction surveys. Measuring problems that do not occur — that are prevented — is difficult, however, and requires an analytical approach.

Thus, a common perception about the value of remote monitoring is that the primary benefit results from the speed with which Avaya responds to and resolves alarms. Nevertheless, remote maintenance activities can also have substantial preventive value.

In an effort to help shed some light on the preventive value delivered by Avaya remote monitoring and maintenance services, Avaya Labs was charged with analyzing actual customer service data and how service levels might be impacted by Avaya service support. The objective of a recently completed study

was to analyze the effects of remote monitoring on outage events — that is, to determine if there is a correlation between remote maintenance and the prevention of outages. We began by differentiating between the customer types (with remote monitoring vs. without) and the various types of trouble tickets, and then gathered data on trouble tickets determined to be major and service-affecting from a customer perspective.

After analyzing data from monitored and non-monitored systems between January 1, 2008 through June 30, 2008, we found that systems that experienced a major problem had 74% fewer outages when monitored remotely by Avaya. This general effect was detected consistently across all major product groups and software releases — for example, with outage rate reductions of approximately 73% for Avaya Communication Manager, 73% for Avaya DEFINITY Servers, 36% for Call Centers/Call Management Systems (CMS), and 69% for Enterprise Messaging products.

Therefore, the analysis was able to quantify the preventive value of remote monitoring as a reduced rate of service outages. This finding supports the claims of the benefits of Avaya Maintenance Services — namely, its ability to maximize communications system availability.

1.2 The Avaya Approach to Remote Maintenance

An Avaya Global Services Maintenance Agreement includes: hardware/software repair or replacement, on-site technician support, calls for technical support and consultation, access to software and firmware updates, web ticketing and status, technical documentation, periodic security alerts and preventative maintenance health checks; but most importantly, remote monitoring and trouble resolution. Under an Avaya Global Services Maintenance Agreement with **Full Coverage**, customers receive comprehensive remote maintenance support on either a 24-by-7 or 8 am-to-5 pm business-day level, including:

- Remote technician and Avaya Help Desk support provided by over 2000+ highly trained and certified engineers that are located across the globe providing 24x7 coverage if desired.
- Proactive fault/alarm monitoring using Avaya EXPERT Systems for Avaya DEFINITY and Avaya Communication Manager, Messaging systems and Call Center solutions.
- On-site support or replacements parts that may be necessary to clear a fault
- Additional service elements such as:
 - Online Web support – Ticketing, Status updates and Technical documentation
 - Power Surge Protection
 - Access to Software, Firmware and Security Updates
 - Toll Fraud Indemnification
 - Preventative Maintenance Routines
 - Access to InSite Knowledge Management
 - HealthCheck Reports
 - Proactive Case Status Alerts

Avaya technicians are trained on customer devices so that they are knowledgeable about the equipment and prepared to address communications maintenance needs for a broad range of products and applications. Avaya EXPERT Systems establish a “machine-to-machine” connection to detect and resolve system alarms through a patented process involving a proprietary database of more than 30,000 artificial intelligence algorithms that have been collected and expanded upon since 1986. The combination of remote technician support and Avaya EXPERT Systems diagnostics deliver an overall resolution rate of 99% of alarms on all Enterprise Communications Solutions.

Section 2. Avaya Study Rationale

2.1 Overview

To measure the preventive value of remote monitoring, the authors faced two challenges: (1) finding a way to quantify the value in tangible terms, and (2) effectively communicating this value in terms of benefits with which the customer can easily identify. Avaya Labs addressed both issues through statistical analysis of customer and business process data available from the Avaya ticketing system.

The basic approach was to compare two groups of products — those that are actively monitored and those that are not. Avaya Labs then analyzed various product performance metrics to determine the effect of remote monitoring, focusing on the frequency of what were characterized for these purposes as outage events — major problems that affected the customers’ service.

The statistical methodologies that were utilized by Avaya Labs for the analysis are well established and widely used for observational studies in areas such as public health research and the development of medical treatments or drugs. Depending on how data is collected, different methods are required in order to handle the analysis properly.

2.2 Narrowing the Database for Study

The first step was to use a statistically valid data set as the basis for the study. Avaya Labs looked at a subset of products that have remote alarming capabilities. The study included evaluation of Avaya DEFINITY, Avaya Communication Manager, Call Center, and Messaging systems world wide.

Avaya service activities are managed by a centralized system that creates a trouble ticket for each request. The customer, or an Avaya associate, can generate a trouble ticket through a phone call or Web entry — or, it can be generated automatically through a product alarm detected through a machine-to-machine connection. Typically, trouble tickets contain information such as the product type, the severity of the problem, ticket description, and customer location. Depending on the value of these attributes, a ticket will be routed to different workgroups. If the initial workgroup cannot resolve the problem, the ticket is routed to a subsequent workgroup (e.g., dispatch or escalation) until the problem is resolved.

For the four selected product groups, data was extracted for all trouble tickets received during a six month period between January 1, 2008 through June 30, 2008.

2.3 Definitions & Assumptions

In this study, tickets were analyzed based on how they affected the customer rather than how they were resolved (i.e. remote technician or Avaya EXPERT Systems vs. on-site dispatch). Avaya Labs looked at the events that are typically the most severely service-affecting and characterized as Totally-Out-Of-Service (TOOS).

In the Avaya ticketing system, a trouble ticket that is marked TOOS in its description field identifies an outage event. For customer calls, this is usually determined when the ticket is opened and an Avaya associate manually inserts TOOS in the description field. For alarms, this is usually determined after a remote technician fails to connect to the product and calls back to the customer to confirm that the site is out-of-service.

Section 3. Measuring Value and Impact

3.1 Examining the Data at a High Level

The procedure used to analyze the data was similar to a case control study in the sense that care was taken to make sure any comparisons were apples to apples (i.e. like to like). For example, products that are not capable of generating alarms (i.e. not capable of being remotely monitored per our definition) were excluded from the analysis.

The data in Table 1 was gathered and statistically analyzed to compare the proportion of TOOS outages among all the monitored products against the proportion of TOOS outages among all the non-monitored products.

Table 1 Outage Data by Monitored vs. Non-Monitored systems

Outage Data by Monitored vs. Non-Monitored systems			
	Number of Outages for Products Experiencing a Major Problem	Number of Products Experiencing a Major Problem	Outage Rate
Monitored	1,103	27,786	.0397
Non-monitored	697	4,631	.1505

In the spirit of having an “apples-to-apples” comparison, it made sense to exclude products that never generated any major severity tickets. Therefore, considering only products that had reported major problems, the outage rate for monitored products was .0397 (1,103/27,786) while the outage rate for non-monitored products was .1505 (697/4,631). Thus, the data indicated that a non-monitored product was almost 3.8 times as likely to have an outage as a monitored product, provided that the product experienced at least one major severity problem.

Finally, when analyzing frequency tables, it is well known that high-level summary results can occasionally contradict results obtained from lower-level details. This is known as Simpson’s paradox in statistical literature.

3.2 Drill-Down Analyses by Product

Just because the benefit of remote monitoring could be shown at the population level didn't mean it was also true for each individual customer. However, if the benefit could be demonstrated at both the population and sub-population levels, the evidence would be much stronger. Thus, calculations were made for each of the four product groups in the study — finding that the benefit of remote monitoring was observable consistently across products as illustrated in Figure 1.

Table 2 Outage Rate Per Product

Outage Rate per Product				
Monitored	No. of Systems	No. of Outages	Outage Rate	Outage Rate Reduction
Avaya DEFINITY	4,147	213	.0514	73%
Avaya Communication Manager	17,870	513	.0287	73%
Call Center	716	28	.0391	36%
Messaging	5,053	349	.0691	69%
Not Monitored	No. of Systems	No. of Outages	Outage Rate	
Avaya DEFINITY	782	147	.1880	
Avaya Communication Manager	2020	212	.1050	
Call Center 0.1, 0.2, 0.3	441	27	.0612	
Messaging 0.1, 0.2, 0.3	1,388	311	.2241	

The following bar chart reflects the information from Table 2.

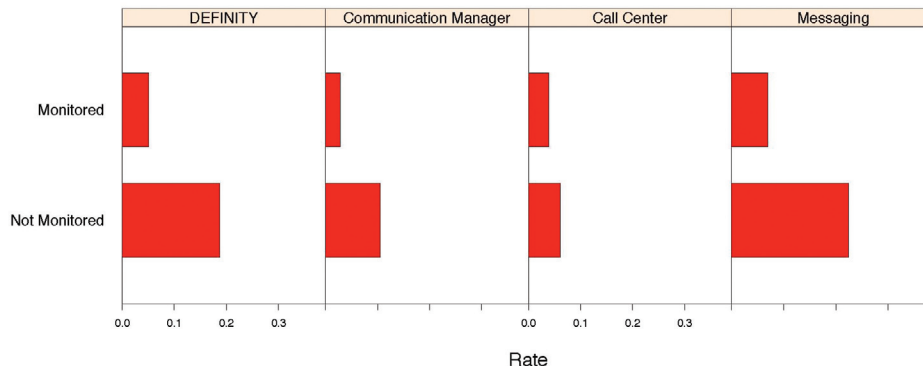


Figure 1: The reduction of outage rates due to monitoring was consistently observable across product groups.

3.3 A Model to Quantify Benefit of Risk Prevention

How can one quantify the business benefit of risk prevention that was identified with remote monitoring and maintenance? To illustrate the possibilities, a simple cost-benefit analysis was developed, based on the following basic assumptions:

1. If a system is completely out of service, the impact to the customer will be proportional to the number of users supported by the system. This, in turn, is proportional to the number of registered ports.
2. The impact to each individual will vary; therefore, in the calculation below, we recommend using an average percent to represent the amount of productivity loss across the entire organization.
3. Actual downtime can be measured or estimated.

From these assumptions, a simple formula can be derived to calculate the financial benefit of outage reduction from having remote monitoring support.

Let **R1** represent monitored systems that had at least one major severity problem. **R2** will represent systems that are not monitored and had at least one major severity problem. **P** will be the probability that a product will have at least one major severity problem. **D** will be a constant representing the estimated duration (in hours) of a downtime event. **I** reflects the average percent of productivity loss. **C** denotes the financial loss for each affected individual port for each hour of system downtime. Then, the financial benefit of remote monitoring for each supported port can be calculated as follows:

$$(R2 - R1) * D * P * I * C - (\text{Price per Port})$$

Thus, as long as the annual total maintenance price (per port) is lower than the financial benefit from the expected outage rate reduction, the customer receives a net business savings.

There are other benefits of an Avaya Global Services Maintenance Agreement that are not incorporated into this simple cost-benefit calculation and there are other costs to consider when evaluating the value of remote

monitoring and the cost of system and network downtime. In addition to employee productivity costs, consider: customer service, incoming orders/revenue, the delay impacts to “just in time” manufacturing and delivery, the ability to meet customer Service Level Agreements (SLAs), the ability to invoice and post revenue, interest costs to the business for borrowed capital and operating expenses, the inability to accept calls though your company is incurring cost for the phone lines/T1's, and the cost to the company's reputation.

Section 4. Conclusion

The ultimate measure of customer value from Avaya Maintenance Services is system availability. To increase this value, Avaya can: (1) resolve problems more quickly when they occur, and/or (2) prevent the problem from occurring in the first place.

A common misperception among customers is that maintenance service is primarily about repairing problems after they occur. For corrective maintenance, the simplest business model is cost-based, where one pays Per Incident (known previously as Time & Materials) fees after receiving service. In addition, there is a great deal of emphasis on measures such as time-to-respond or time-to-repair statistics. The preventive part of the value proposition is usually viewed as a product reliability issue and not as a service maintenance objective.

While this approach may be true for traditional hardware maintenance, an updated concept has been evolving rapidly in the modern services industry, which is increasingly software-centric and focused on creating new value through preventive maintenance.

According to this study conducted by the Data Analysis Research Department of Avaya Labs, the process of dealing with remote alarms (via Avaya EXPERT Systems, remote technicians, and whatever actions are necessary to solve the problem) has quantifiable effects in terms of reducing the risks of customer outages. The data analysis showed products that experienced a major problem had fewer outages if they were covered by an Avaya Global Services Maintenance Agreement with remote maintenance and support elements. The quantifiable effects of remote maintenance activities are broad and more fundamental than merely responding to individual alarms. It is true that the Avaya EXPERT Systems Diagnostic Tools and remote technician processes are capable of processing tickets quickly, to help resolve a problem within minutes so that it is less likely to be service affecting. However, this study showed that much of the value of remote monitoring and maintenance is in preventing outages.

Avaya Labs has concluded from this analysis that the preventive effect of remote maintenance is a hidden value proposition that truly differentiates Avaya from its competitors and offers significant value to our customers.

While You Were Sleeping/EXPERT View® Reports

Avaya has developed a value-based business impact report, entitled “While You Were Sleeping”. This report, previously known as the Avaya EXPERT View Report, reflects the number of alarms and trouble tickets received during a specified timeframe. It estimates the cost that your business would have incurred if your company had not been protected by remote monitoring and trouble resolution. Remote monitoring and trouble resolution are key elements that are provided as a major component of an Avaya Maintenance Agreement for Avaya Enterprise Solutions (Avaya DEFINITY, Avaya Communication Manager, Call Center and Messaging). The While You Were Sleeping/Avaya EXPERT View Report compares the potential revenue loss avoided to the number of alarms,

troubles and tickets that were addressed due to having been protected by an Avaya Maintenance Agreement. This report allows the customer to fully comprehend the value of remote monitoring and trouble resolution as part of their maintenance agreement.

The Information Technology Services Marketing Association (ITSMA) is a global membership organization that specializes in helping firms market and sell technology services and solutions. After evaluating a number of leading programs, in 2004 ITSMA awarded Avaya Global Services a gold Marketing Excellence Award in the category of Increasing Sales Effectiveness for its “While You Were Sleeping” campaign. “While You Were Sleeping” provides thought leadership in demonstrating the value of remote monitoring and trouble resolution of communications systems and networks through the development of the Avaya EXPERT View Report.

Avaya Proactive IP Support

Avaya continues to enhance the level of support that is provided to Avaya IP Telephony customers by offering Proactive IP Support. This solution combines the power of Avaya EXPERT Systems with the Avaya Enterprise Services Platform to monitor all of your communication systems; as well as all of the elements within your network. Since converged networks are impacted by the flow of both voice and data traffic, it is important to care for the entire network holistically and monitor all of its components. As an IP Network encounters large traffic volumes, jitter, latency and QoS may degrade as a result. Proactive IP Support monitors the entire network and resolves problems as they arise.

5.0 About the Authors

The study underlying this white paper was performed by Wen-Hua Ju and Jim Landwehr, members of the Data Analysis Research Department, Avaya Labs. This approach is based on prior studies, which others had contributed in the past.

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Avaya’s portfolio of Intelligent Communications solutions can help you transform your business. For more information on how Avaya Global Services can take your enterprise from where it is to where it needs to be, visit our Virtual Executive Briefing Centers for an online briefing click on Executive Briefings then click on Intelligent Communications under “*Connect with Avaya*” at www.avaya.com

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The Avaya logo consists of the word "AVAYA" in a bold, red, sans-serif font. The letters are closely spaced, and the 'A's have a distinctive shape with a slight curve at the top.

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