VitalApps™ Software for Wireless Performance Management

Wireless providers need to improve the performance of wireless data services and reduce the economics associated with customer care.

Wireless performance management software solutions reduce customer care costs and enhance customer retention

This white paper addresses:

- Common requirements for managing high-speed mobile data
- Methods to improve customer care effectiveness
- Operational expense reductions through proactive problem resolution
- Improved customer retention through enhanced customer experiences
- Operational and financial benefits of Lucent VitalApps™ Application Performance Management software

Lucent Technologies
Bell Labs Innovations



1 Introduction

The rapid and efficient introduction of wireless data services is a critical component for success in a wireless provider's business strategy. Wireless data end-users are highly desirable because of their tendency to be volume users of both voice and data services, equating to a sizable monthly ARPU and a strong retention history. Customer care for such users becomes equally critical, to ensure the success of new services as well as the retention of customers. With increased pressure to participate in the growth of wireless data services, the efficiency and responsiveness of an organization can directly impact the ability to attract and retain these targeted customers.

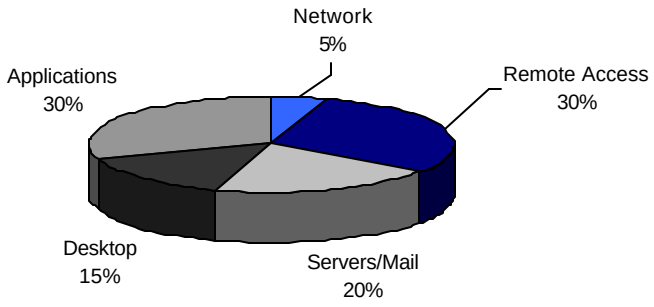
This paper outlines the requirements for the advanced tools required for provider troubleshooting organizations that support wireless data end-users. The paper illustrates how such advanced tools substantially improve the economic performance of wireless data service and enhance the capabilities of CSR processes. Additionally, these tools will improve the overall visibility of customers' service quality experience and provide for faster trouble resolution to enhance customer satisfaction.

With the market for wireless data and high-speed wireless data services is growing steadily, offering competitive, quality-focused services will drive successful service adoption. To attract and retain these users of both wireless voice and data services resources are required that may impact your customer care support headcount and trouble resolution requirements or processes. Additional details on wireless users are covered in this paper, including wireless laptop user problems, and how many are associated with application and desktop issues and not attributed to wireless data access or backhaul networks.

1.1 A Significant Percentage of Customer Care Calls are not Network Related

Mobile providers early support experience is verified by industry statistics. For example, the following chart shows a breakdown of 180,000 calls to the help desk of a large enterprise customer, who has deployed wireless data for its users. Only 35 percent of the calls are remote access or network related, while the remaining are desktop, application or operating system based. Although a good percentage of these "non-network related" calls should be handled by the enterprise, it is inevitable that some calls are incorrectly directed to the wireless carrier.

Figure 1 – Large Enterprise Call Volume by Problem Type[1]



[1] Call Volume by Problem Type. Source: Lucent Technologies IT Organization, 2003

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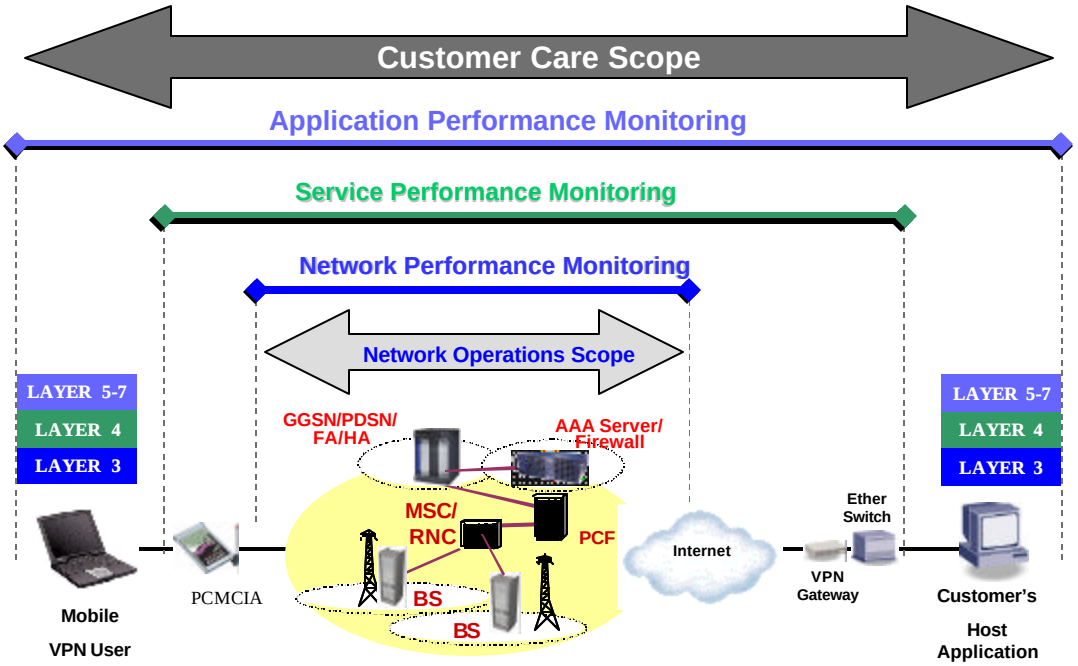
Figure 2 - Customer care must support the end-to-end experience.



1.2 Customer Care for Wireless Data is Complex

Most wireless carriers have mature systems for responding to customer calls regarding voice services. Customer care requirements for data are different from voice. Wireless data users often have technical issues that are more complex. Additionally, existing performance management tools are usually designed for the needs of other organizations such as network operations, taking a network-centric view of performance. In response to these conditions, service providers must review opportunities to gain visibility into customers' end-to-end experience with data services. This document reviews innovative software tools that can help Customer Care Representatives (CSRs) support remote laptop users.

As illustrated by Figure 2, several network elements are required to conduct a Mobile VPN data session. While this illustration depicts a VPN call, most data calls have many of the same service components. Although delivering high quality customer care in this complex network architecture can be challenging, customer service representatives (CSRs) need to quickly identify the potential root cause of customer complaints. To be effective, CSR must have tools and methodologies to provide fault isolation. For example, wireless data laptop customers tend to have a significant number of issues with their laptops and associated applications, including a wide array of problems such as device configuration, connectivity, IP - VPN issues, and application responsiveness issues.. These issues can often result in a call to a customer care organization. Being able to isolate mobile data problems automatically so that network related issues get solved quickly and customers receive accurate, faster diagnosis to problems can result in exceptional quality care.

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2 Requirements

This document provides valuable information on opportunities to improve your customer care for laptop users. It outlines (10) Common Requirements for providing better customer service. This list is based upon Lucent's extensive work with service providers and enterprises. At a high-level these requirements include:

- **Alarming** on performance issues that are customer application related
- **Diagnostics** including remote testing capabilities that are initiated by your CSRs
- **Reporting** on application performance, which enables you to document issues to your customers and your internal departments such as Network Operations or Billing.

Lucent determined, based on experience, most customer care personnel recognize these needs but they often struggle in demonstrating quantifiable business benefits. Typically, they expect to reduce churn as well as operational expenses by implementing an improved solution of tools and methodologies for their CSRs. These tools can also help carriers differentiate their service, which can result in helping attract and retain customers.
Customer care tools should be designed to improve the capabilities of your CSRs and increase your understanding of your customers' experience, provide for faster trouble resolution times and improve customer satisfaction. Detailed below are 10 common requirements for software tools that will help your customer care organization meet their objectives.

2.1 Detailed Descriptions of Common Requirements for Customer Care

The following descriptions provide a detailed view of common requirements and benefits required by customer care organizations that are troubleshooting data services for remote laptop users. The capability to cover these requirements is an important factor in success with wireless data services.

1 - Remote Initiation of an Echo Test for CSR Remote Diagnostics
CSRs can use the Echo Test to quickly identify IP and application level connectivity between a remote laptop and an IP Target. These tests are helpful for real-time testing and debugging of network and/or host problems.

2 – TraceRoute for CSR Remote Diagnostics
The ability to run a remote traceroute test on a specific customer allows the CSR in real-time to determine packet delay caused by each hop in a route. It enables a CSR to demonstrate that a specific network element is causing excessive delay. These results can be shared with other departments (i.e. Network Operations) or customers as required.

3 – Remote Capture of Client Network Configuration for CSR Remote Diagnostics
CSRs can use this test to query parameters related to the network configuration of a remote laptop including IP configuration, network interface card (NIC) configuration, active routes, and active connections. This information can help the CSR determine if the user has a configuration issue.

4 – Remote Packet Capture for CSR Remote Diagnostics
CSRs can use this test to capture any network traffic to or from the specified remote laptop. This test lets you perform detailed application- and network-level troubleshooting. The output of this test is provided in both hex and ASCII format, and can be saved in sniffer format if desired.

5 - Alarming and Reporting VPN Tunnel Setup
The ability to alarm and report on VPN Tunnel Setup Statistics is required for all customers. It is also needed for a single customer (i.e. an alarm and report that is specific to an individual customer showing VPN Tunnel Setup Statistics). The ability to alarm and report on VPN Tunnel setup statistics, including total numbers and related failures, allows CSRs to determine if a VPN setup issue is on the client's laptop

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or on the enterprise's VPN gateway hardware. These alarms and reports can allow the CSR to proactively see VPN issues and report them to their customer.

6 – Alarming and Reporting on Application Availability
The ability to alarm and report on Application Availability is required for all customers. It is also needed for a single customer (i.e. an alarm and report that is specific to an individual customer showing application availability).

It allows the CSR to determine if a customer complaint is related to a specific application or if all applications are having a similar problem. If a single application is not available while other are operating normally, then the CSR can offer that information to his customers. These alarms and reports can allow the CSR to proactively see application issues and report them to their customer.

7 - Alarming and Reporting Application Response Time
The ability to alarm and report on Application Response times is required for all customers. It is also needed for a single customer (i.e. an alarm and report that is specific to an individual customer showing application response time).

It allows the CSR to determine if applications are responding slowly to users' requests. If a single application is reporting slow response times while other are operating normally, then the CSR can offer that information to his customers. These alarms and reports can allow the CSR to proactively see application issues and report them to their customer.

8 - Alarming and Reporting on Available Network Throughput
The ability to alarm and report on Available Network Throughput is needed for all customers. It is also needed for a single customer (i.e. an alarm and report that is specific to an individual customer showing available network throughput).

This requirement allows the CSR to determine how much data is being transported by the network. A CSR can see if a customer usage has suddenly reduced or if there has been a historical trend. This information can be helpful in billing questions, especially as it documents a customer's usage by time. These alarms and reports can allow the CSR to proactively see throughput issues and report them to their customer.

9 – Alarming and Reporting on Network Round Trip Delay by Application
The ability to alarm and report on Network Round Trip Delay is needed for all customers. It is also needed for a single customer (i.e. an alarm and report that is specific to an individual customer showing network round trip delay by application).

It allows the CSR to determine the transport delay by application. If a single application is reporting slow response times while other are operating normally, then the CSR can offer that information to his customers. These alarms and reports can allow the CSR to proactively see application issues and report them to their customer.

10 - Alarming and Reporting on Connection Speed
The ability to alarm and report on Connection Speed is needed for all customers. It is also needed for a single customer (i.e. an alarm and report that is specific to an individual customer showing customer connection speed).

It allows the CSR to demonstrate the speed of users' connections. If users for a particular customer are showing a decrease in connection speed, the CSR might run a report to see if the decrease is happening for all customers on the network. If all customers on the network are experiencing slow connection speeds, then the CSR might report this to network operations. These alarms and reports can allow the CSR to proactively see application issues and report them to their customer or other internal organizations.

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3 The Lucent VitalApps™ Application Performance Monitoring Software Solution

Addressing these technical issues requires an advanced customer care tool. Lucent VitalApps™ Application Performance Management software manages and optimizes wireless performance for today's laptop users of wireless data services. VitalApps™ software is a proven software tool that reliably supports the special needs of customer care organizations to perform fault isolation and application performance reporting and improve customer satisfaction

VitalApps™ software provides the data necessary to proactively diagnose connectivity and other wireless-driven performance issues, before they affect the user. It presents the real-time wireless performance visibility required to measure, manage and enhance session-specific performance of wireless high-speed data (2.5G and 3G), Wi-Fi, and managed LAN services.

This integrated performance optimization and application correlation system monitors every user transaction from the laptop or desktop, through the network, to the destination server. It offers a comprehensive look at how end-users experience mobile high-speed data performance and availability.

The system is comprised of several software modules. Summary descriptions of the VitalApps™ are provided below:

- **VitalAgent™ Clients**— A software client installed on a user's laptop that monitors each Transmission Control Protocol (*TCP*) transaction through components along the network path. VitalAgent™ clients record measurements for a variety of activities such as response times and delays to bottlenecks and failures for each user transaction and upload the information to the VitalApps™ servers.

- **VitalApps™ Servers** — VitalApps servers aggregate data from mobile clients devices including session specific performance metrics. One or more servers can be used to collect, analyze, and display information for end users depending on the size of the network. Information can also be forward to other systems and devices. The server does real-time analysis of application performance from end-user and/or synthetic users point of view. Service level monitoring and capacity planning is tracked as well as the availability and historical performance of TCP/IP-based business applications, tracking the historical performance of business critical applications running over the network. The server also helps assess the health of TCP/IP-based networked applications. After the servers analyze this information, network staff can access it from the VitalApps™ Web Console, the web portal into the VitalApps™ data. With the VitalApps Web Console, they can proactively identify and troubleshoot problems before they impact end-users and the network.

- **Transact Toolkit**—Lets administrators define specific business transactions based on business processes. Using Transact Toolkit, you can define business transactions for Windows, web, database, telnet, and TN3270 applications. These business transactions are monitored by your VitalAgent™ clients. The collected data is then forwarded to the VitalApps servers.

- **Optional - VitalAgent™ Automon**—A specialized VitalApps™ agent that offers active monitoring capability. You can configure VitalAgent™ Automon to simulate the actions of a VitalAgent™ end-user by automatically running transactions from specific VitalAgent™ clients. The transactions are monitored and VitalAgent™ uploads information about them to the VitalApps™ servers.

3.1 Overview of VitalApps™ in a Wireless Network Architecture

VitalApps™ is comprised of several software modules. At a high level, VitalApps™ is software that sits on your customer's laptop (VitalAgent™) and software that resides on servers in your network (VitalApps™ Servers). This is depicted in Figure 3. On the laptop, Lucent VitalAgent™ software passively monitors the data that is sent and received by the remote user. The VitalAgent™ summarizes this performance data

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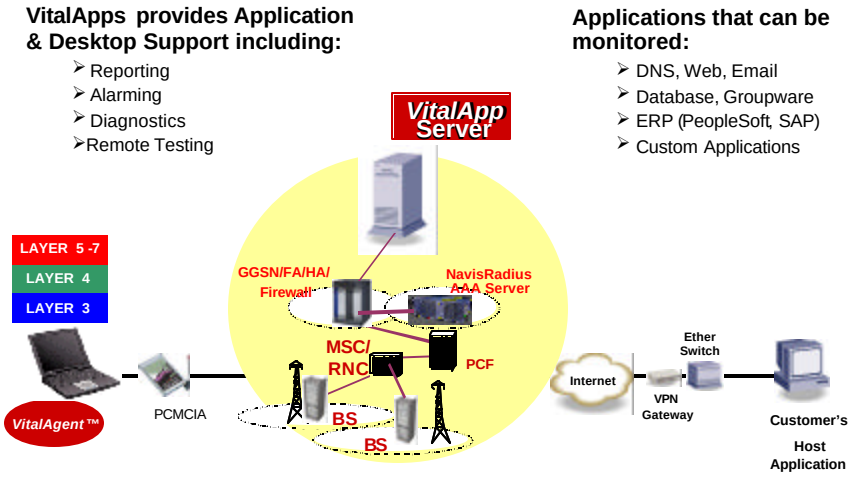
and sends packets to the VitalApps™ Servers. Usually this data is sent to the VitalApps™ Server once every hour but VitalAgent™ can send a packet in real-time if it sees a fault condition. The VitalApps™ Servers analyze, report and alarm on the data provided by the VitalAgent™.

CSRs access VitalApps™ Servers via web browsers where they can view alarms, run reports and conduct remote diagnostics on specific remote users.

Figure 3 - VitalApps™ improves customer care for wireless data services.



4 Achieve Rapid ROI Trough Quantifiable Business Benefits

VitalApps™ delivers quantifiable business benefits that generate rapid Return-on-Investment (ROI). Potential financial benefits can be derived from:

- Reduction of Operational Expenses
- Reduction of Subscriber Churn
- Increase in Service Revenue

Generally, we expect the financial impact of advanced customer care tools to exceed 4% of your wireless data service revenue and this translates to a multi-million dollar benefit to your business. Specific benefits will be based upon your requirements and implementation.

4.1 Financial Analysis Example

The following sections demonstrate the financial impact of advanced customer care tools on wireless data services. We will use the following assumptions in this analysis.

4.1.1 Assumptions

	1st Year	2nd Year	3rd Year
Subscribers (Average # every month)	200,000	300,000	400,000
Monthly Service Pricing (including erosion)	$69	$59	$49
Annual Service Revenue (Subs * Monthly Pricing * 12)	$166M	$212M	$235M
Annual Call Volume	400,000	600,000	800,000

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to Customer Care (Subscriber base calls 2 time a year)			

4.1.2 OPEX Savings

The following provides an overview of potential operational savings provided VitalApps™, an advanced customer care tool for wireless data services. Savings are generated through faster root-cause isolation. VitlaApps™ provide the Customer Service Representatives with instant information on the subscriber's configuration. If the CSR had to capture this information manually from the subscriber, it would take extra time and exhaust the subscriber's patience.

Our study is based on a situation with 200,000 high-speed data customers in year one growing annually by 100,000. Assuming each customer calls 2 times per year and average cost to field calls of $12.50, annual customer support can run into the millions as shown below. Robert Francis Group estimated support groups calls for major enterprise users at 9.6 calls per year. They also found that only two third of calls to tier 1 were answer in less than 10 minutes.[2] The others were sent on to more expensive tier 2 and 3. In our study, we focus only on tier 1 for purposes of simplification. Thus, actual operations expense savings may be greater.

Assumptions for Customer Care Data:

	1st Year	2nd Year	3rd Year
Annual Call Volume to Customer Care	400,000	600,000	800,000
Carrier Cost Per Call	$12.50	$12.50	$12.50
Annual Total Cost	**$5.0M**	**$7.5M**	**$10.0M**

Advanced customer care tools VitalApps™ can help address 30% of incoming support calls. Further, we expect a cost reduction on of those calls of 50% due to fast call resolutions.

OpEX Savings with Advanced Customer Care Tools:

Call Volume to Customer Care Addressable by VitalApps ™ (30%)	120,000	180,000	240,000
Call Cost Reduction	50%	50%	50%
Annual Savings with Advanced Customer Care Tool	**$0.75M**	**$1.13M**	**$1.5M**

4.1.3 Churn Reduction

Advanced customer care tools enable you to reduce subscriber churn. They allow you to provide faster customer service and to identify issues that are not network related (i.e. a subscriber's VPN gateway is down and blocking access to an application). Small changes in subscriber churn can have substantial impacts on service revenue. This example shows how retaining 2% more subscribers will affect service revenue. It does not considered the costly expensive of regaining lost customers in such a case.

	1st Year	2nd Year	3rd Year
Subscribers Growth without Adv. Cust Care Tools	200,000	300,000	400,000
Subscribers Growth when	204,000	306,000	408,000

[2] Robert Francis Group. 2003.

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using an Adv. Cust. Care Tools			
Increase in Subscribers when using Adv. Cust. Care Tool	4,000	6,000	8,000
Annual Revenue Increase due to Churn Reduction	**$3.3M**	**$4.2M**	**$4.7M**

4.1.4 Increase Service Revenue

Advanced customer care tools can increase service revenue. They can be used to provide a high quality of customer service, which translates into more value the subscriber. Depending on your marketing efforts, this value could be captured in a separate premium service with a premium price or it could be used to slow any price erosion associated with your service. The example below shows the financial benefits of slowing price erosion by 10%.

	1st Year	2nd Year	3rd Year
Monthly Price without Advanced Tools (Price Erosion is $10/yr)	$69	$59	$49
Monthly Price with Advanced Tools (Price Erosion is $9/yr)	$70	$60	$50
Annual Revenue Increase Per Subscriber (Due to Adv. Tools)	+ $12 year	+ $12 year	+ $12 year
Total Annual Revenue Increase Due to Advanced Customer Care Tools (Revenue Increase * Subscribers)	**$2.4M**	**$3.6M**	**$4.8M**

4.1.5 Financial Summary

As demonstrated in this example, even small enhancements to important aspects of your business can make material improvements on your business plan.

	1st Year	2nd Year	3rd Year
Annual OPEX Savings	$0.7M	$1.1M	$1.5M
Annual Revenue Increase due to Churn Reduction	$3.3M	$4.2M	$4.7M
Total Annual Revenue Increase Due to Reduced Price Erosion	$2.4M	$3.6M	$4.8M
Total Annual Benefit of Advanced Customer Care Tools	**$6.4M**	**$9.0M**	**$11.0**

5 Summary

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Advanced customer care tools can make a significant impact on the wireless data business. They can improve the efficiency of operations and customer satisfaction. Lucent's VitalApps™ supports the needs of wireless data service providers and delivers quantifiable business benefits.

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