



| WHITEPAPER

Taking the Trouble out of Troubleshooting

THE “THREE C’S” TO ISOLATE AND MANAGE PROBLEMS WITHOUT IMPACTING END USERS

Authored by

Kevin McGowan | Chief Technology Consultant | Clarus Systems, Inc.

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During all stages of the lifecycle of an IP Communication (IPC) system, a critical success factor is a properly implemented and executed problem management strategy. Integrating troubleshooting strategies which eliminate or minimize end user impact remains a pivotal component to ensure the successful completion of daily projects and tasks required to optimize the total benefits of an IPC environment.

Problem scenarios are routinely presented in everyday life. For example, a minor fender bender occurs while driving to the office. Upon reenacting the chain of events, you followed your normal routine, left for the office at the same time, took the usual route and traveled at the speed limit – yet here you are exchanging insurance information. Every month when writing that check to an insurance provider, you questioned the need for coverage but the investment now seems well worth it.

The same scenario holds true for problems which occur within a voice-enabled environment -- making the proper investment in the required processes, management applications, and resources will give piece of mind when it is needed most.

To validate the need for a tried and true problem management strategy built on effective troubleshooting, a recent research brief from Nemertes Research titled *How to Plan for Voice Over IP (It's Tougher Than You Think)*, Robin Gareiss, EVP and Senior Founding Partner, notes the following: “Also, make sure you know whether the vendor provides direct customer support and technical troubleshooting, or whether customers must go through a channel partner to get the help they need. If the latter, ask about their training and support.”

Whether part of an Operations group within an enterprise or a Managed Service Provider (MSP), effective IP Communication management strategies require a foundation built on the three “C’s”:

- **C**ustomer Satisfaction,
- **C**ost Management, and
- **C**omprehensive Problem Management.

This whitepaper will explore the effectiveness of troubleshooting to enable a comprehensive problem management approach which ensures issues are reported, identified, resolved, and verified without impacting end users during business hours. It will also discuss the conundrum faced by an industry that continues its over-reliance on end users during the problem management process. The positive outcomes for following the “three C” principles will be true customer satisfaction, substantial cost savings, and a framework for comprehensive problem management – all built upon the foundation of a truly integrated IPC approach.

CUSTOMER SATISFACTION -- THE PROBLEM WITH STATUS QUO PROBLEM RESOLUTION

The first “C” towards taking the “trouble” out of troubleshooting is customer satisfaction, which focuses on problem identification. With customer satisfaction, end users become the focus as the first rung on determining any functionality or dissatisfaction issues – keeping this group happy can determine potential impact on a company’s core business. End users are the most critical group since there is a great need to ensure an optimized level of service availability and performance – however, end-users are also the most challenging to support. Regardless if you are part of an Operations group team or a MSP, the focus on the end user remains constant and equally important. Proper management of end users will increase the ability to more effectively manage the client – whether internal or external -- and will result in continued advancement/introduction of relevant technology and up sell opportunities.

Traditionally, customer satisfaction is measured by the organization that provides the service and support, and it typically covers the following components:

- Issue Response Time
- Mean Time to Repair (MTTR)
- Issue Closure Time

These steps are heavily reliant upon end user involvement in the process – this presents many obstacles to successfully managing reported issues. These end user challenges include inconsistency of the problem reporting, unreliable information/data, unwillingness/ unavailability to be present when the support team is ready and, most importantly, difficulty to determine the scope/impact of the problem.

An example of an end user hindrance scenario is a call is placed that fails on the initial attempt. On the second try, the call goes through so this momentary interruption is not important enough to take the time and effort to report, so no trouble ticket is logged. A few weeks pass and more of these unreported intermittent problems that go unnoticed are now the main contributor to an overall system outage. This status quo approach and reliance upon the end user will continue to plague the industry unless those forward-thinking organizations wake up to the realization that the end user is only one fraction of an overall systemic problem that could take down their IPC environment.

Fast forward to 2008, support organizations and service providers are now engaging in re-engineering their processes by implementing standards based on the IT Infrastructure Library (ITIL). The shift to ITIL, as it relates to customer satisfaction, focuses on early detection of problems to reduce or eliminate end user/service impact as it relates to relying upon them to assist with all phases of problem management. It also opens the door for improvements to root cause analysis and determination. The customer satisfaction is unanimously positive with a confident Voice Engineer, satisfied end user, and encouraged VP of IT or CIO that realizes a return on his or her telephony investment. Simultaneously, productivity increases and process efficiencies continue to be proven effective.

COST MANAGEMENT -- TROUBLESHOOTING COST IMPACTS

The second “C” on the path to removing the “trouble” from troubleshooting focuses on cost management. This component quantifies an end users impact and enables support organizations to properly prioritize problems, manage resources, and the client. The ability to detect problems early and control end user/service impact significantly decreases the cost impact to the support team and their clients. This can be represented using three tiers of costs related to problem detection ranging from “\$1 to \$100” – where problems which result in end user/service impact and require end user involvement in the problem management continuum increases costs and vice versa.

Greater end user/service impact results in problem escalation to a higher level of support, which significantly increases the costs to resolve the problem.

\$1 | \$10 | \$100 – HOW MUCH DO YOUR PROBLEMS COST?

To represent the cost impact for problem detection and management, we will use a tiered cost structure of \$1, \$10, and \$100 and illustrate how one similar scenario can increase in escalation. The detection of failed international calls through proactive testing conducted during non-business hours would result in no end user/service impact and could be managed without escalation – the representative cost would be \$1.

If that same problem is detected at the start of the business day after two to three call failures, it would result in slight end user/service impact and could be handled with minimal escalation as proactive testing during non business hours determined that calls were working -- the representative cost would be \$10.

Taking that same problem and having it reported by end users would result in significant end user/service impact and would require immediate escalation -- the representative cost would be \$100.

This model reflects the escalating costs/impact for both the support organization and their clients if problems are not detected early.

The following chart provides examples of 5 common problems encountered within an IPC environment and proactive resolution tactics for cost effective problem management.

5 Common Problems Proactively Solved

1. Improper Gateway Provisioned in Routing Tables

The gateway for one office was improperly provisioned into the routing tables for another one.

- Problem determined during Configuration Analysis - no end user impact: representative cost = \$1
- If problem was not discovered, this would have resulted in call routing over the Network WAN (unplanned traffic) resulting in call failure for all users within that office: representative cost upwards of \$100

2. Voicemail Accounts not Provisioned for Users

A group of users did not have their voicemail accounts provisioned.

- Problem determined during Configuration Analysis - No end user Impact: representative cost = \$1
- If problem was not discovered this would have hampered both the caller and intended voicemail recipients, which would have impacted their business: representative cost upwards of \$100

3. Call Forwarding to Off-Network Numbers

Some non-personnel phones were configured post deployment to forward inbound calls to off-net numbers.

- Problem determined during certification testing - no end user impact: representative cost = \$10
- If left undiagnosed, this could mushroom into a potential fraud issue giving after hours personnel the opportunity to forward these phones to outside long distance or international numbers: representative cost upwards of \$100

4. Direct Inward Dial Calls Fail to VIP Users

A group of VIP DID users cannot receive calls due to external callers restrictions resulting from a Local Exchange Carrier (LEC) translation issue

- Problem determined during Certification testing - No end user impact: representative cost = \$10

5. Outbound Calls Fail for Single Office

All Outbound calls for one office failed due to a PRI failure

- If problem is not discovered during certification since failover testing was not included in the overall certification test plan, end users impacted: representative cost upwards of \$100

COMPREHENSIVE PROBLEM MANAGEMENT

Finally, the third “C” truly eliminates the “trouble” from troubleshooting through a comprehensive problem management strategy that builds a template for success and a methodical process to drive towards root causes. As previously discussed, Voice Engineers encounter many hindrances that can provide obstacles to problem management issues. The key lies in understanding the root cause and taking the proactive steps that fix the problem and prevent it from occurring again. Imagine the benefit to the company if the Voice Engineer can expeditiously find the impact, prioritize it and manage the problem effectively before it affects communications. Problem management success is contingent upon the ability to properly prioritize, manage and allocate the appropriate resource levels and skills.

- Problems can be detected in all areas of an IP Communications system - ranging from simple daily tasks to major upgrade projects. Critical in the process is the establishment of the proper monitoring and management strategies that deliver an efficient and effective problem management process.

COMPREHENSIVE PROBLEM MANAGEMENT STRATEGY

Comprehensive Configuration Management

The first step on the road to troubleshooting success is implementing a comprehensive configuration management process with the focus on two primary areas -- operational readiness/periodic baseline and change management.

Operational Readiness

Operational readiness includes the in-depth analysis of all system, location, and device level configurations within an IP Communication system. Operational readiness occurs as an IP Communication completes the deployment phase and transitions into on-going management. This is a critical process and, if successfully completed, ensures the support team understands all components within the system to be managed. Periodic baseline is the comprehensive analysis of all system, location, and device level configurations performed on a routine basis. The best practice for periodic baseline configuration analysis is implemented on a quarterly basis.

Change Management

Change management includes the tracking of all system, location, and device configurations updates performed on a routine basis. Following the establishment of a baseline, all changes from that point need to be compared against design/system and customer compliance standards. Change management includes configuration comparison/analysis, alerting, and reporting with notification to the appropriate support team and customer as required.

Voice Service Management

One of the more difficult but critical aspects of comprehensive problem management is to determine the voice service impact of changes, failures, or degradation to the network. This is due to the reliance on end users to report issues which can result in unreliable or inaccurate information. To ensure support teams are properly informed of both the scope (number of end users/locations) and impact (service(s) which is failing), monitoring all critical voice services and the underlying network and system components is critical.

With proper voice service management, the support team can instantly know when calls fail and implement a monitoring strategy that provides the proper level of granularity to prevent failures of other local, long distance, international, toll free calls. A proper monitoring strategy significantly decreases the time required to determine root cause as well as provides increased visibility into any changes to the system – this practice resolves the reported problem without adversely affecting other voice services.

Active Testing

IP Communication networks and systems are very complex, yet provide a significant level of flexibility that addresses the majority of customer needs. The combination of complexity and flexibility can result in many changes to accommodate problem resolution, network expansion, and new features/capabilities, among others.

To properly manage these changes, the introduction of active testing ensures that expected results were achieved without impacting existing voice services from an end user perspective prior to the start of the next business day. Active testing can also provide visibility into the availability and performance of voice service during non-business hours. Proactive testing can also be included in the voice service monitoring strategy to determine all levels of service failure or degradation.

End User Support

As consistently mentioned throughout this paper, end user reported issues are the most challenging element of the problem management process. End user issues are also the most costly for both the customer and support team as these problems can negatively impact the bottom line due to the resources required to manage them.

Support Solutions to Success

End user reported issues provide the perfect environment to assess the effectiveness of a successful problem management strategy.

Solution 1: End User Reported Issue Description

End users often lack the technical knowledge to describe and accurately reproduce the intricate details of a problem to a support team member.

→ With the ability to perform active testing, the support team is less reliant on the end user description of the problem. Active testing enables the support team to perform the steps to reproduce the problem as if the end user originally placed the call, which can be performed when the end user is away from the office to eliminate any business impact.

Solution 2: Service Restoral

Service restoral always presents a challenge to the support team as end users want their issue resolved as quickly as possible. Simultaneously, the support team is attempting to capture as much information and data as possible to assist the problem management team with the determination of root cause.

→ With the implementation of comprehensive configuration management and automated testing, the support team can focus on resolving the end user issue quickly, which often includes utilizing a temporary workaround.

Solution 3: Problem Identification

The end user issue description is typically a symptom of the problem, but does not identify the bigger potential systemic issue. It is critical to capture both the end user issue description as well as the similar perspective from the support team member. For example, the end user will report an inability to access voicemail, while the support team would view that same issue as a connecting ports problem.

→ Using a voice service management approach, the support team can diagnose the port issue and correlate it to the end user call attempt.

Solution 4: Problem Isolation

As previously mentioned, the most challenging aspect of problem management is the determination of the scope and service impact of a problem. Without this problem isolation, the inability to determine root cause will lead an environment of reoccurrence.

→ With the proper level of voice service management and automated testing, the scope of the problem and service impact can accurately be determined – the end result is a significantly higher percentage of problem resolution where root cause is determined.

Solution 5: Root Cause Identification & Analysis

Without understanding root cause, problems can persist for weeks, months, or even longer. The identification of root cause is the most critical component of problem management. However, since significant support resources and end user involvement need to be applied, root cause is very often difficult to determine.

→ An end-to-end strategy encompassing comprehensive configuration management, voice service management and automated testing will instantly identify root cause with minimal impact to end users.

Solution 6: Problem Resolution/Closure

The final phase of problem management is the most pleasant one -- resolving and closing the ticket. If an interim solution was not available for the reported problem, this step of the process is unfortunately reliant upon on end user interaction. The difficulty obtaining responses from the end user can hinder the ability of the support team to close a ticket.

→ Active testing enables the support team to verify the resolution and close ticket without needing end user confirmation.

Long term problem management success is contingent upon an enduring troubleshooting strategy built on best practices for deployment. Operations teams must adopt problem management methodologies as an integral part of a best practices strategy. In the end, Operations group members can rest peacefully without agonizing about the number of calls and trouble tickets to expect on any given morning.

CASE STUDY #1: MEDICAL DEVICE INDUSTRY

For a real life example of troubleshooting success, a well-known medical system reaped the benefits of a well constructed problem management plan. The organization developed a proper problem management process that included comprehensive end user certification. As part of the deployment, thousands of problems were identified and determined that application availability was compromised – calls were going through but the system was impacted in handling calls. After conducting thorough testing to see if calls were processed correctly, the Operations group found that calls monitored for different applications were routed correctly over congested networks. End users would never have realized that calls were not routed over the most desirable path – calls were routed through a higher cost facility versus a more cost effective WAN. If this organization had not invested the time and resources into constructing a well devised problem management strategy, then a total systemic meltdown of its IPC environment could have ensued.

CASE STUDY #2: GLOBAL FINANCIAL SERVICES FIRM

As another example, a global financial services firm with 25,000 devices worldwide is taking a leap of troubleshooting faith. The organization reported a significant increase in end user satisfaction by reducing end user interaction during problem reproduction steps. In addition, the company provided ad-hoc training when the problem was determined to be result of end user error -- trouble closure does not require end user verification and they have realized an overall reduction in end user issues resolution. In terms of problem management, the firm saw a reduction of problem identification/isolation related to configuration changes. Now, a proactive voice service availability testing/monitoring process allows end user impacting issues to be discovered 24x7. Plus, detailed problem reproduction testing/analysis enables higher percentage of work-arounds/root causes for reported problems.

SUMMARY/RECOMMENDATIONS

The continued reliance upon the end user will not contribute to overall problem management and will bring even more trouble into troubleshooting for Operations teams. By investing in a holistic strategy that includes configuration analysis and baseline testing, an organization can navigate through the seas of change by adopting the three “C’s” to identify, prioritize, and manage problems effectively before impacting IP Communications.

About Clarus Systems and Troubleshooting

Clarus Systems, Inc. is a leading provider of integrated management and testing solutions for IP Communication deployments, upgrades and transformations. The company recently launched its new Transformation Services Deployment Best Practice guide, providing organizations with a standardized set of processes and methodologies to leverage throughout the deployment and ongoing operations of Cisco Unified Communications Manager (formerly CallManager). The adoption of these strategies can enable the successful execution and completion of CUCM Deployment projects based on a hybrid approach that bridges Cisco's PDIOO methodology with the Information Technology Infrastructure Library (ITIL) standards.

The new ClarusIPC Plus+ 2.4 comes full circle adding business intelligence and performance management to its solution for total end-to-end voice service management. This new version extends the company's integrated pillar approach to empowering Unified Communications by offering system validation through troubleshooting and diagnostics, business intelligence for detailed reporting and analytics, and performance management to define thresholds for optimized voice performance including server health, gateway capacity, media resources and device registration.

The troubleshooting capabilities within ClarusIPC maximize IP Communications availability and performance while empowering Tier-1 responders to be armed with the intelligence for effective problem management. Standardizing support processes results in reduced end user involvement during troubleshooting by eliminating voice issue ticket escalation,

- Reducing costs and accelerating the time to value of the IPC investment
- Increasing user satisfaction and confidence on cutover day by virtually eliminating post-cut tickets
- Increasing Tier 1 support productivity and reducing MTTR
- Driving standardization enabling Engineering & Operations teams to be more efficient

The standard ClarusIPC® application is utilized by enterprises, systems integrators and managed service providers (MSPs) to support the deployment and optimization of IPC solutions. ClarusIPC® is scalable and offers remote certification, configuration analysis, and troubleshooting – further validating operational integrity while building the foundation for a Unified Communications network. ClarusIPC® is the only testing solution endorsed by Cisco in the Best Practices guide, "Steps to Success" and Voice Monitor recently received the "Best Tools" award from the 2007 Cisco's IP Telecommunications User Group (CIPTUG) Application Bake-Off.

About the Author

Kevin McGowan is responsible for managing and optimizing all customer deployments. Prior to joining Clarus Systems, Kevin was VP of Operations of Valiant Networks. In that role, Kevin designed performance management and verification solutions for service providers that included state of the art Technical Assistance Center ("TAC") and Network Operations Center ("NOC") software and systems. Prior to Valiant, Kevin served as VP of Next Generation Integration/Operations at Global Crossing. In that role, he was responsible for product evaluation, certification and OSS integration testing of VoIP deployment, as well as development and deployment of the Network Operations Center ("NOC"). At Digital Switch Corporation (now Alcatel), Kevin served as Director of the Customer Technical Assistance Center (CTAC) where he supervised a 7x24 support center for all switching and the Signal Transfer Point (STP) system managing 130 technical support staff. He was also responsible for the certification of all hardware and software releases at DSC and has extensive experience developing migration strategies that support the transition from a circuit switching to a packet switching network.



2200 Bridge Parkway, Suite 101
Redwood City, CA 94065

650.632.2800 | 650.632.2810 (fax)

www.clarussystems.com | info@clarussystems.com

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