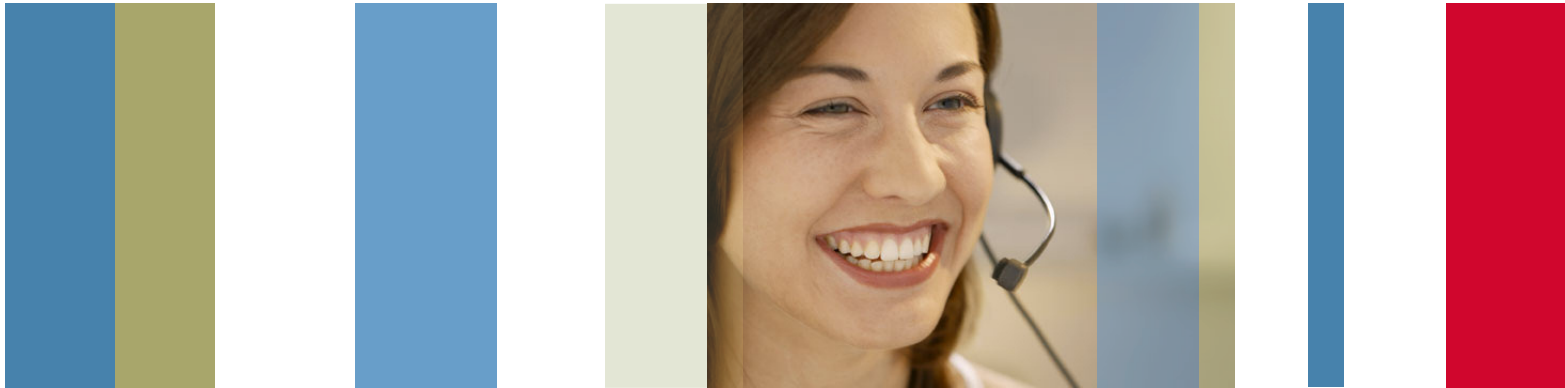


# SLA Troubleshooting with Active Testing

## Long-term testing techniques for anticipating network issues



### Customer Retention and Cost Reduction Challenge

A large fixed-line service provider with customer care facilities was experiencing a number of minor problems due to routing issues that when taken together was costing them money and customers. Tektronix has reduced the operational costs and customer churn for this service provider by providing better network testing techniques.

### Overview

A large, modern call center relies on a mix of equipment from different vendors that often blends different generations of technology. This equipment works together due to the standards-based telecommunications environment, to provide a seamlessly integrated service. However, in practice, the reality is not so straight-forward.

Calls are dropped for no known reason due to sporadic call management issues. Passive diagnostic tools are used reactively to help engineers localize the problem, but no proactive methods are used to monitor the behavior of the call center equipment.

In this solution note, we discuss the role of active testing that generates a battery of test calls through a call center. Passive monitoring techniques are used to monitor the routes taken by these test calls.

A new Tektronix feature allows test calls to be kept alive for up to 24 hours if a service quality issue is identified during active testing. Meanwhile, an alarm message is sent to warn technicians of the failed test call. This message alerts technicians to begin troubleshooting to find the call, investigate the root cause of the failure, and take corrective action.

#### Issue:

- Network drops calls during routing
- Company is charged for calls that go unanswered
- Customer satisfaction suffers

#### Solution:

- Use long term proactive testing
- Use automation to verify all routes on a regular basis

#### Merits:

- Prove a network is meeting its Service Level Agreement (SLA)
- Reduce customer churn and improve customer satisfaction
- Avoid costs due to dropped calls
- Validate billing information
- Monitor quality during migration to an all-IP infrastructure



## A Changing Environment

This service provider is migrating to an all-IP call center for improved scalability, trouble ticket management, call routing, and customer care agent utilization.

As part of this process, the service provider is using multiple technologies to support their call center network. A third-party 800 number is used for incoming calls.

## Call Center Operational Overview

A call to customer care is routed as follows (see Figure 1):

- 1 Customers call a toll-free 800 customer care number.
- 2 Calls arrive at the central office. The calls are forwarded to an IVR that gets the option code from the callers.
- 3 The calls are then routed to the call manager.
- 4 The call manager forwards the calls to the appropriate customer care agent depending on the IVR option code.

## Call Routing Issues

The number of customer calls arriving at the IVR (2) are fewer in number than those received at the central office (1). Also, the number of calls arriving at the call manager (3) are fewer in number than those received at the IVR (2). Calls are being dropped as they progress through the network and the reason for this is unclear. See Figure 1.

A call through the central office and call center may take many different routes, making it difficult to find the origin of the routing problem.

Investigative techniques using passive probes was used to identify why calls were being dropped. However the passive probes recorded an enormous amount of data from calls that were connected successfully. When a dropped call was found, it was nearly impossible to reproduce the scenario to verify whether a corrective action had an effect because call traffic follows continuously fluctuating routing patterns.

## Voice Quality Issues

Once a call was connected, sometimes the voice quality was unacceptable. Again, due the dynamic nature of call routing, it was impossible to identify the equipment specific to any one call. Voice quality issues are often caused by interoperability issues.

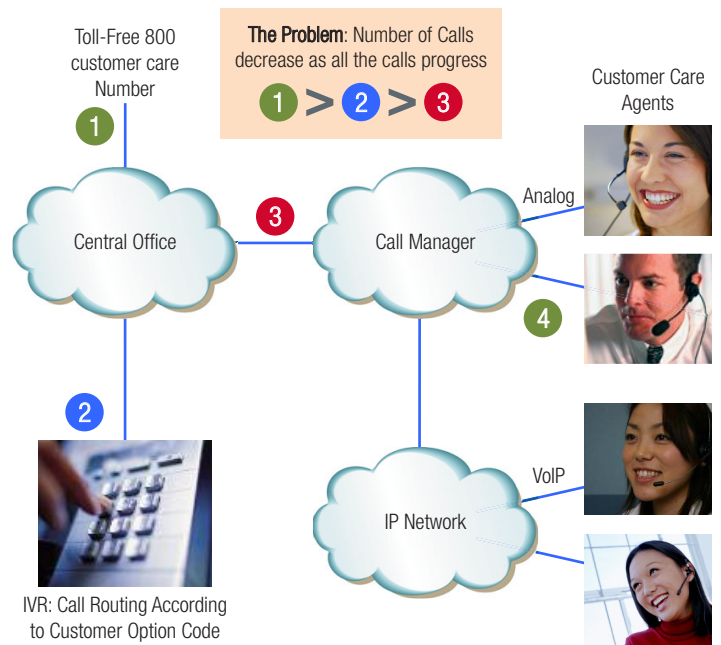
## Using Active Testing to Simulate Calls

Before the call center is opened, an automated battery of active test calls warms it up by placing hundreds of PESQ voice-quality test calls to probe endpoints that are dispersed throughout the network. This identifies paths that are experiencing service quality problems. If a test fails, a new DirectQuality® feature keeps the line open to allow technicians to trace the problem route with a passive probe.

## How Active Testing Works Together with Passive Monitoring

Combining active testing with passive monitoring allows the service provider to place test calls through specific call routes to verify connectivity and service (voice) quality (see Figure 2). When a problem is identified, passive tools help identify the root cause. By regularly running active tests, the call center's overall health can be monitored, thus making it possible to measure the efficacy of any corrective action taken.

Tests are performed as follows:



**Figure 1: Service Provider's Network: Calls were being dropped as they progress through the customer care center**



- 1 Test plans for the active test probes are created with DirectQuality®. These plans determine the battery of tests to be conducted between probes at regular intervals.
  - 2 Active test probes set up test calls. The service quality of the connection is measured using standards-based PESQ algorithms. If the service quality is found to be below a set threshold, the active test probe holds the circuit open. An alarm message notifies technicians of this condition.
- For example, if a test call between PowerProbes does not connect, this may indicate that the call is being incorrectly routed by the IVR.
- 3 Passive test probes monitor both the routing and the progress of the test calls. The passive test probes can focus exclusively on the activity of the PRI numbers assigned to the active test probes. If the call is dropped or the service quality is poor, the passive probe is used to trace the route and identify the root cause.

- 4 Active test results are stored on the DirectQuality server and can be consulted through the server's Web interface.

Active testing allows service providers to test their network routing automatically on a regular basis, allowing them to proactively detect problems before they become customer issues.

## The Cost of Routing Mismatches

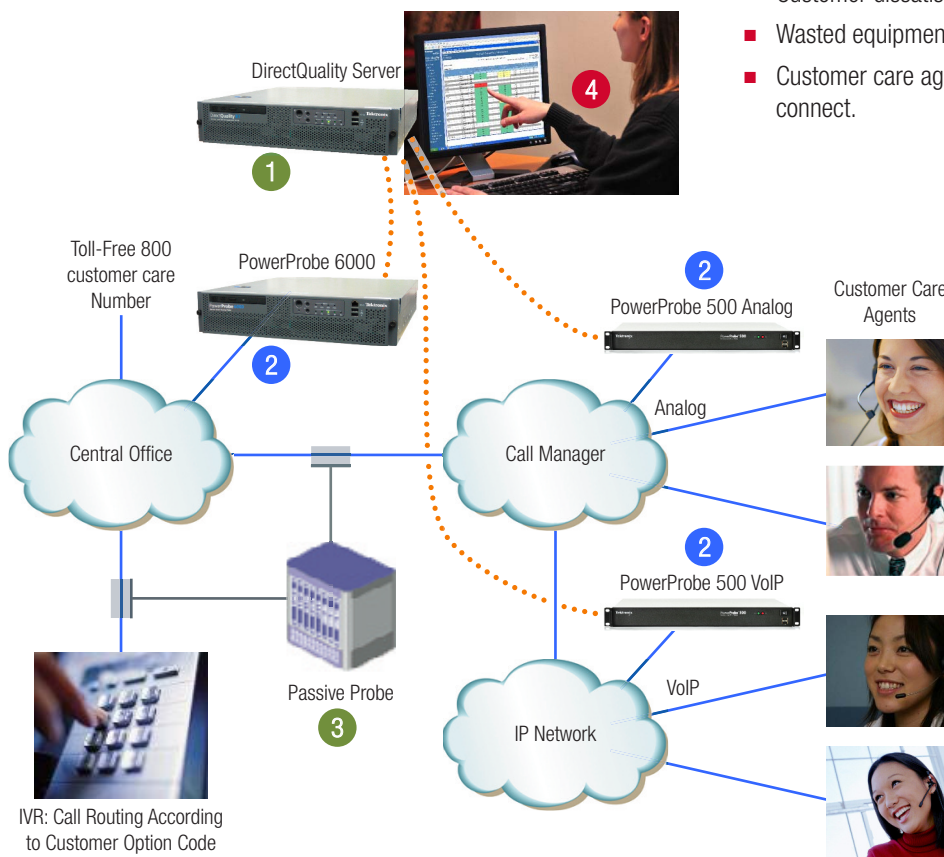
The service provider estimates that every dropped call costs them \$50. The following items describe some of the costs of a dropped call:

- Billing for 800 number customer care calls that are never routed to a customer care agent.
- Dropped calls and calls with poor voice quality causes customer dissatisfaction.
- Customer dissatisfaction from being routed to the wrong agent.
- Wasted equipment capacity in the call center.
- Customer care agents are idled while waiting for calls that do not connect.

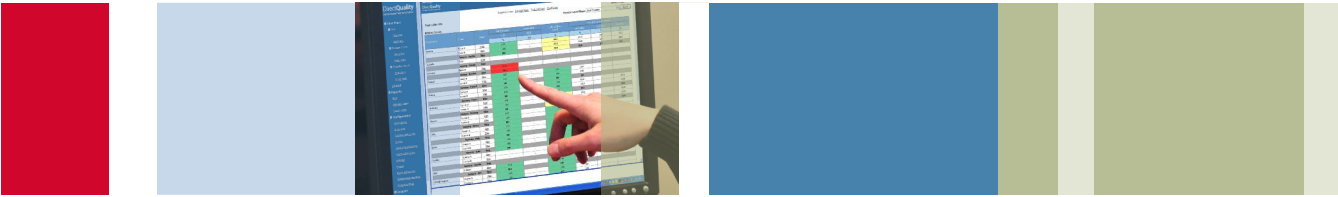
## Further Angering Dissatisfied Customers

Customers who are already having unrelated issues with your service are going to be further upset when they undergo additional difficulties trying to contact customer care. Losing a customer is very expensive due to the cost of acquiring a replacement customer in a highly competitive industry (advertising, promotional offers, service provisioning, etc.).

This is why it is so important to have a customer care organization that professionally handles customer concerns with efficiency.



**Figure 2: Test Setup: Test calls are made with Tektronix's active probes to measure service quality - Passive probes are used to trace and localize routing problems**



## Key Features and Benefits

- Test calls are automated with test plans. Only test calls that fail require a technician to investigate the root cause.
- Proactively identify problems before they become an issue for your customers.
- Use an effective method that saves time and money.

## Summary

By using active testing and passive monitoring to supervise the overall health of a network, the service provider has improved the quality of its service and has saved money due to decreased churn, as well through better utilization of equipment and customer care agents.

If you would like more information about how to reduce costs or to gain a better understanding about how Tektronix can help isolate routing issues in your network, please contact Tektronix Active Assurance Marketing Department at +1-514-879-9111 ext. 284.

## About Tektronix:

Tektronix has more than 60 years of experience in providing network operators and equipment manufacturers with an unparalleled suite of network diagnostics and management solutions for fixed, mobile, IP and converged multi-service networks.

These solutions support architectures and applications such as fixed mobile convergence, IMS, broadband wireless access, WiMAX, VoIP and triple play, including IPTV.

## For Further Information:

Tektronix maintains a comprehensive, constantly expanding collection of application notes, technical briefs and other resources to help engineers working on the cutting edge of technology.

Please visit [www.tektronix.com/ActiveAssurance](http://www.tektronix.com/ActiveAssurance)

## Contact Tektronix:

Please visit [www.tektronix.com/ActiveAssurance](http://www.tektronix.com/ActiveAssurance)

Phone:  
1-800-833-9200 option 1  
+1-469-330-4000

Locate your nearest  
Tektronix representative at  
[www.tektronix.com/contactus](http://www.tektronix.com/contactus)