



Performance monitoring software for business-critical systems

# IP Telephony Customer Service Delivery for the Managed Service Provider

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As IP telephony (IPT) has matured and Managed Service Providers (MSPs) manage increasingly large-scale deployments, the concept of voice communications service delivery has also developed.

The MSP that manages IPT not only needs to be able to follow the break/fix philosophy, it also needs a high-level view of the entire environment to manage customer expectations for voice quality and service availability.

This paper explores service-level reporting and demonstrates how solutions such as PROGNOSIS IP Telephony Management Reporter can provide the MSP with the necessary visibility across the IPT environment.

IPT0106-01

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## Managed Service Provider IP Telephony Service Delivery

Until recently, managing IP telephony (IPT) mostly focused on a break/fix philosophy. As IPT matured, the enterprise implemented increasingly large-scale deployments, and the concept of voice communications service delivery developed. Now that the MSP has entered as a technology manager, satisfying the customer with well performing, reliable and quality voice services have become important deliverables.

As in most cases, the customer's telecom group is no longer a separate entity and is now under the management of the IT organization, the CIO/IT manager now has the purview of the overall IPT environment in addition to the health of the servers, network and desktops for data applications. This provides the MSP with the opportunity to expand the services it offers. The better and faster the service provider deals with voice network issues, the greater the customer loyalty.

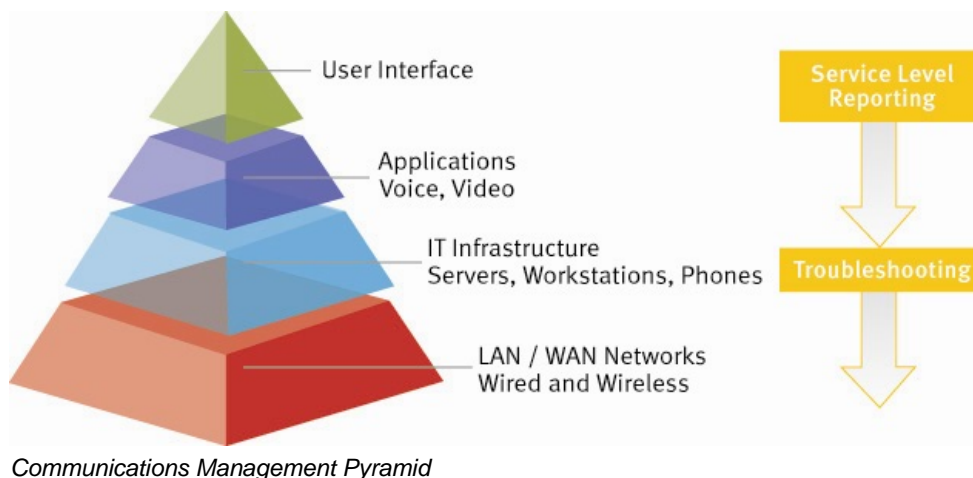
The difference for the MSP is that their past experience has been ensuring availability and fixing problems, not providing a high level of continuously acceptable performance. When data network problems occur, customers usually experience a slower network, or little or no access. With voice, however, performance issues rise to top priority. A slow network or server will still mean that the user can perform work, albeit less productively. A poor call, on the other hand, means potentially no communications and lost productivity. A poor quality call equals a failed call.

## Voice Service-Centric Management

Those who manage IPT not only need to be able to follow the break/fix philosophy, they also need a high-level view of the entire IPT environment. A data technician is usually called in when there is a failure and something is broken or mis-configured; something the data technician needs to repair or modify. The technician has a set of tools for diagnosing the problem at a very detailed level so that it can be fixed.

However, the MSP now needs to know how all the components are working and whether or not they are delivering satisfactory service levels to the customer. In addition to break/fix, degrade/improve performance mentality must also be encompassed. Troubleshooting failures will still continue and management tools for break/fix solutions will be required. A service-level reporting system must be added to the MSP's toolset to deal with the degrade/improve performance issues.

As can be seen below, the data technician works within the lower two levels of the Communications Management Pyramid. The upper two levels, which deal with the end user, require service-level reporting that provides the visibility that encompasses the end-user experience.



Communications Management Pyramid

## Goals for the MSP

The MSP now has goals above and beyond fixing problems and providing available services. Some of the goals are qualitative and therefore difficult to measure; customer satisfaction with voice services is an example of this. The common management goals for dealing with customer satisfaction are:

- > Provide proactive, not reactive management
- > Deliver a high level of user satisfaction
- > Ensure that the delivery promises are met
- > Provide a global view of the environment, not just a detailed view of a problem
- > Reduce management time relating to performance issues

These goals require measurements that are not usually part of the data management systems that are dedicated to managing data infrastructure and applications. Most data users expect their services to work and will accept a slower operation temporarily, anticipating that the infrastructure will soon return to proper operation. While they experience impairments, data users can usually perform work, albeit slower. A total failure, where there is no productivity at all, is less common.

Some data users may resort to using their telephones to partially compensate for a loss, such as e-mail or IM not working. However, when a phone is necessary to complete the work, then IM and e-mails are not good enough. The goal for voice services is to provide consistently high performance under varying network conditions. Service-level reporting is the only way for the MSP to have the necessary visibility across the customer's IPT environment.

### Questions the service delivery manager should consider:

- Do you want to offer a premium service to your customers?
- Do you want to on-sell PROGNOSIS to your customers?
- If you don't use PROGNOSIS, how do you currently justify payment?
- How do you know in real time, if faults occur?
- How do you know if there is enough capacity for next month or next year?
- Do you know if you have met or breached your SLA before the end of the month?

## Service-Level Management Requirements

Once companies complete the early stages of IP telephony deployment and address their real-time monitoring, troubleshooting and service continuity requirements, they typically mature to a more service-centric mindset.

This mindset calls for a medium- to long-term analytical approach that relies on IPT-specific, time-based reporting capabilities that span four key areas: service levels, voice quality, capacity planning and IPT analytics.

Managed Service Providers, responsible for managing their customers' IPT environments, have a twofold requirement for this type of reporting:

1. To substantiate success and measure the performance of IPT delivered to the MSP customer (service levels and voice quality) and validating the IPT deployment
2. To optimize the delivery of IPT to the customer (capacity and analytics) while correlating faults across multiple operational domains and minimizing support calls, thereby maximizing profit margins.

## Delivering Visibility for IPT Services

Service-level reporting needs to incorporate and display information in several forms within an easy to use intuitive interface. There will always be more information than a human can absorb. This means that a reporting system must digest, analyse and communicate the overall condition of voice services without overwhelming the MSP staff.

At a minimum, reports should include the availability and performance of the PBX. Basic features should enable IPT deployment optimization as well as contingency and capacity planning, PBX consolidation and risk assessment.

Optimally, reporting capabilities should include:

- > Phone and gateway reports
- > Route pattern and dial plan reports
- > Scheduled report generation
- > Configurable report periods
- > Automatic report distribution
- > Scalability to hundreds of PBXs

The ideal reporting product should add:

- > Customization of reports
- > Multiple report distribution methods with configurable recipients
- > Internationalization (time zones and report formats)
- > Multiple error-handling methods

The types of information reported should include:

- > Availability and performance of devices
- > Good and degraded voice quality
- > Causes of degradation
- > PBX call load, call attempts and completions
- > Busy hour statistics
- > Trunk utilization
- > Call types, length and balance
- > Phone load
- > CPU and node utilization

Presentation of all this information and the visibility it provides, goes well beyond what a traditional troubleshooting and status monitoring tool offers. The reports enable the MSP staff to focus on service delivery and customer satisfaction, not just break/fix responses to problems.

## Key Stakeholders

In order to successfully deliver IPT to any organization, it is vital to meet the requirements of distinct stakeholders – from end user-centric SLA management to technical service delivery at an architectural level. The MSP stakeholder is a job function or person involved with the delivery of satisfactory voice service levels to the enterprise. Since you are reading this paper, you are probably one of the MSP stakeholders.

Although job roles and titles will vary from company to company, the key IPT stakeholders typically represent six different individuals:

- > **Service provider's customer:** An executive who owns the budget and mandate to provide dial tone to the desktop. Needs to know the company is getting what they're paying for.
- > **IPT service delivery manager:** Responsible for implementation of the service. Whether located internally or externally, this person reports to the budget holder (customer) and wants to do more with less. Needs to optimize delivery, understand utilization and measure success.
- > **Operations manager:** Responsible for day-to-day continuity of service, 24/7 monitoring, and ensuring that break/fix processes are followed. Must be confident that they are delivering IP telephony service to the customer. Needs visibility and positive feedback.
- > **Level 1 operator:** Available 24/7 to respond to any incident, service disruption or degradation.
- > **Level 2 support:** Analyses problems and achieves service restoration.
- > **Level 3 architect:** Provides long-term strategic thinking around service continuity and workarounds until problems are solved permanently.

#### Benefits to MSP Stakeholders:

- > **The service provider's customer:** PROGNOSIS delivers customer satisfaction and confidence by providing visibility of telephony availability, utilization, call quality and voice quality information via historical reporting (and an online portal).
- > **Service delivery manager:** PROGNOSIS empowers service delivery managers through comprehensive service level and capacity planning reports and historical data.
- > **Level 3 support:** PROGNOSIS provides detailed reporting for fault analysis and capacity planning.

#### The Four Elements of Voice Service Delivery

Each service provider may differ in the way it wants to group these elements, so a flexible reporting solution is essential. Different stakeholders may have differing priorities for these reports.

1. **Service level** reports should provide an "at a glance" view of overall device availability, as well as for configurable time periods. Key indicators advise if devices such as IP trunks, PSTN trunks and route patterns are impacted, degraded or down.
2. **Voice quality** reports need to provide an "at a glance" view of overall daily and weekly voice quality. In this way, service provider managers can see instantly if they have met the service levels for agreed quality. If there is degradation, they can focus specifically on these occurrences and see what network causes may be responsible.
3. **Capacity planning** reports should provide visibility for optimizing infrastructure, reducing costs and planning for the future. Comparing utilization to available capacity means that designers and architects can ensure sufficient future capacity to respond to changing business environments as well as decommissioning excess bandwidth and trunk capacity.
4. **IPT analytics** reports should produce invaluable data for capacity planning, PBX consolidation and failover contingency planning. Analysing the use of the telephony infrastructure will enable the service provider to advise the customer on ways to create efficiencies and plan for contingencies.

The end result of these reports will:

- > Quantify attained availability vs. target service levels
- > Quantify attained voice quality vs. target service levels
- > Perform capacity planning, PBX consolidation, failover contingency and risk assessment
- > Substantiate success and measure performance of the IPT service

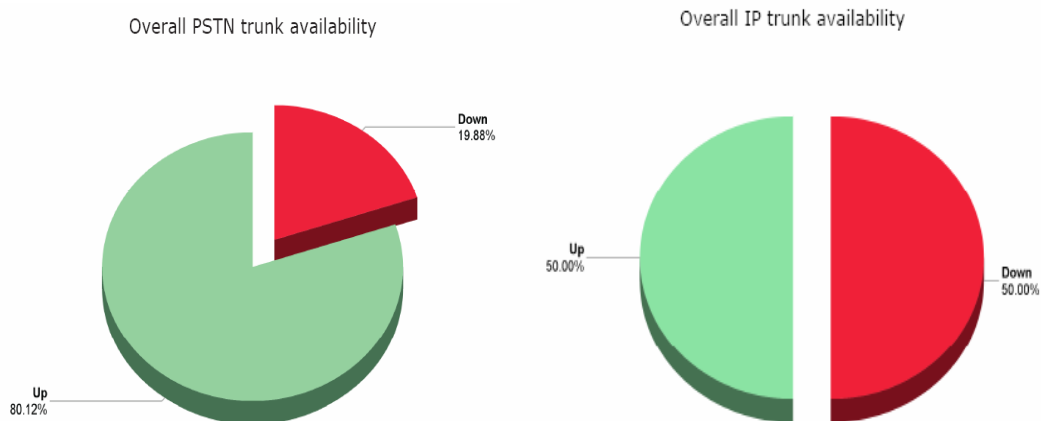
### Service Level Reporting

Service provider managers and operators must be able to validate overall service level availability, as well as availability for specific times. The worst possibility is for the IMSP manager/operator to get a call, e-mail or IM from a customer with service level complaints.

It is embarrassing for the MSP manager/operator to admit they don't know of the problem. It is preferable for the MSP manager/operator – rather than being contacted by the customer – to be able to report the problem and outline plans for its resolution. In order to enable this proactive approach, the MSP manager must know who was affected, how long they were affected, where they were located and if the problem caused service levels to be breached. This will enhance the customer's dependence on the MSP and will result in continued contract renewal.

Here are typical questions that reporting can answer:

- > What was the overall availability of all devices?
- > Were any devices impacted, degraded or down?
- > Which locations or users were affected?
- > What caused the problem and how often did it occur?
- > How long did it take to resolve?
- > Were any service levels breached?



Overall trunk availability as shown by PROGNOSIS IP Telephony Management Reporter

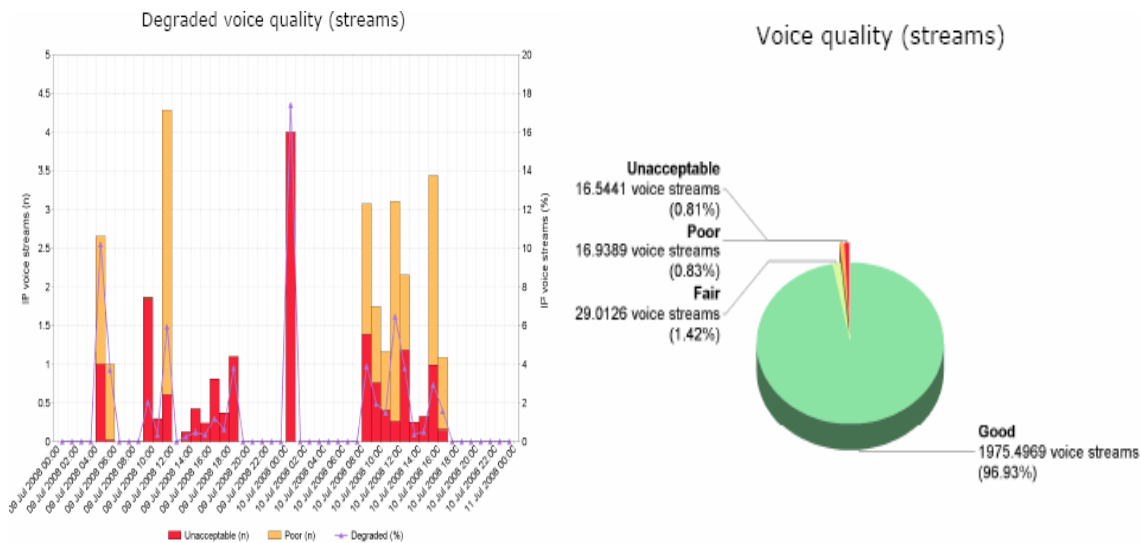
The report examples above show the overall availability of PSTN trunks was a little over 80% but overall IP trunk availability was only 50% for the reporting period. Statistics like these indicate that device availability was significantly impacted and, as a consequence, a high probability that service levels were breached. Other reports that flow from the trunk outages will be useful in providing details of related degradations

## Voice Quality Reporting

A major issue with voice quality is how the end user/customer describes a poor call. The end user is not articulate and experienced enough to be able to pinpoint the problem. The end user complaint is that “the call is bad.” When asked for more information, a common answer is “the phone calls are not very good,” which tells the service provider nothing helpful to resolving the problem. The report system can provide a clearer picture of the location, severity and impact of the poor calls.

Some common questions that reports can answer include:

- > What is overall voice quality like?
- > Was anyone’s calling impaired?
- > How often did this occur?
- > How bad was the call?
- > What caused the problem?
- > How long did it take to resolve?
- > How many voice exceptions occurred?
- > Were service levels breached?



Voice quality excerpts from PROGNOSIS IP Telephony Management Reporter

The voice quality reports shown above present information in a way that can be tailored to suit specific requirements. Consider this situation: The MSP needs an “at a glance” view of the overall customer’s voice quality. The chart on the right shows that overall voice quality was good and only a small number of calls (less than 2%) experienced poor or unacceptable voice quality. The graph to the left illustrates when the impaired voice streams occurred.

Although this is a small percentage, in a large customer organization it may add up to quite a few calls. PROGNOSIS provides mechanisms to focus on the orange and red bars in the chart. This shows the volume of affected voice streams and at what times the problems were experienced. This information can then be correlated with a network “causes report” to determine what caused the degradation, for example excessive jitter and packet loss. Voice quality information is also reported in Erlangs (hours of voice stream traffic).

## Capacity Planning

Capacity planning reports provide data for optimizing infrastructure. They also help identify ways to reduce costs for the customer and thus aid planning for the future. For example, comparing trunk utilization with available capacity ensures sufficient growth potential so the customer can respond to changing business environments. This form of capacity planning results in providing what is needed without excessive over-provisioning.

When a customer encounters economic limitations or reduced revenue/funding, then the CFO will call in the MSP to report on the costs and benefits of the IPT operation. The CFO will most likely pose these questions:

- > Can the network capacity be reduced to achieve savings without affecting IPT service levels?
- > How much growth capacity is available in the present IPT design and is it really required?
- > If another enterprise were acquired, can present service levels be maintained?
- > Is there any excessive or abusive use of the IPT service by individuals or departments?

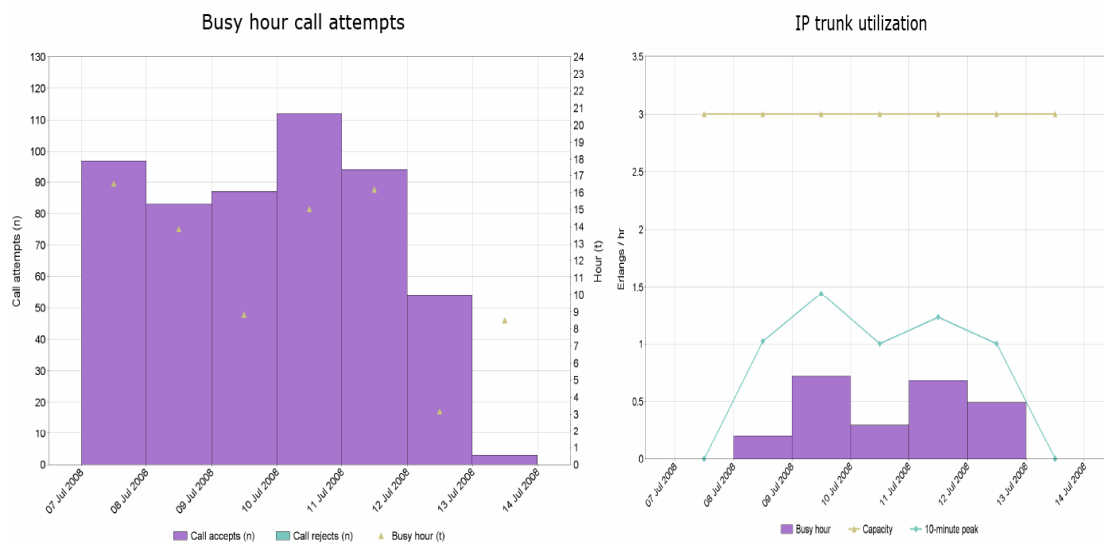
The capacity-planning capabilities of a good reporting system could be used to adequately answer these questions with credible information. The MSP can ensure that the customer's CFO will have the right information. This will increase the loyalty of the customer's CFO because the CFO will be able to do his or her job effectively in cooperation with the MSP.

Phone reports should detail which phones are configured and registered, the types of calls being made, and statistics on those calls, such as the average call length and call rate (per hour). The report should also show the total phone off-hook time, call connection ratio, abandoned or refused ratio, call connection failure ratio, phone usage and inactive phones.

Depending on the MSP hosting model, the enterprise can then optimize its telephony resources and plan for the future by being able to answer the following questions:

- > What is the PSTN and IP trunk capacity?
- > What is trunk utilization?
- > What is growth capacity?
- > How will capacity be affected if one or more trunks fail?
- > Is one of the gateways busier than others?
- > Is there excess bandwidth or trunks that can be decommissioned?
- > Are there any handsets that not being used?





Traffic and utilization measurements from PROGNOSIS IP Telephony Management Reporter

The report extracts above show call attempts during the busy hour. There were no call rejects for the reporting period and each of the days had a different busy hour. The MSP manager can then look at the traffic reports to see what effect business influences have on changing traffic patterns. Such information will help to plan and design IPT services appropriately.

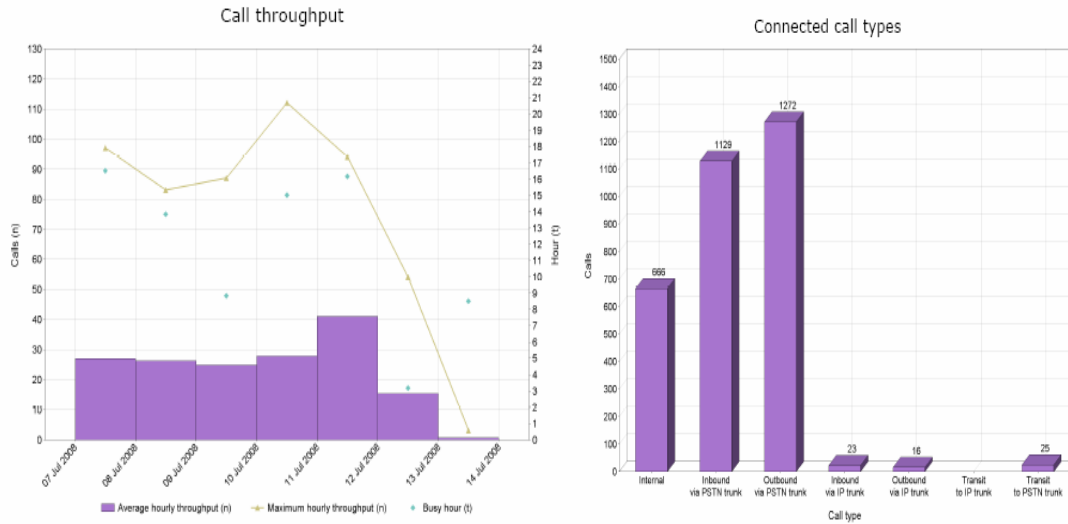
## IP Telephony Analytics

Understanding the use of the telephony infrastructure enables efficiencies to be created and assists with contingency planning. Analysing call load and identifying busy times will help ensure that call loads are distributed evenly across PBXs and servers and will help to optimize system performance and reliability.

The analytics reports provide credible information that can be used when responding to customer CFO and CIO inquires about the cost of IPT services. Without such capacity and usage details, as well as automated measurement, the MSP cannot justify the costs nor demonstrate the resiliency for growth that may be required to meet new business demands.

Some questions that can be answered with these reports are:

- > Is the call load as heavy or light as anticipated?
- > What are the busiest times?
- > Is the call load balanced across available PBX/servers?
- > Are the phones balanced across PBX/servers?
- > Who is making the longest calls?
- > Who are they calling and for how long?
- > Is one of the gateways busier than the others?
- > How many calls are internal, or outbound; via IP or PSTN trunks?
- > What is the Grade of Service?



Call throughput and connected call types as seen from PROGNOSIS IP Telephony Management Reporter

MSP managers need to know how many calls the organization is making each week and what the average busy hour was. The service goal is that all calls are completed and none are blocked. If the number of attempted calls vs. completed calls is too large, then some redesign of the IPT service is warranted to reduce the number of unsuccessful call attempts.

**Average busy Hour call statistics**

PBX	BHCA	BHCC	GoS	PBX Erlangs	Erlang / Device	Busy hour time
DVR-PUB-Cluster	7	7	0.00%	0.07	0.00	22:50
\SYDNEY-PBX	100	100	0.00%	7.26	0.05	15:00
All PBXs	100	100	0.00%	7.26	0.03	15:00

IPT analytics from PROGNOSIS IP Telephony Management Reporter

## Conclusion

The concept of voice communications service delivery has changed MSP management dynamics from implementing break/fix resolutions to providing a high level of continuously acceptable performance. Those who manage IPT not only need to be able to follow a break/fix philosophy, they also need a high-level view of the entire IPT environment, as well as confirmation that all components are working and delivering satisfactory service levels.

Measuring customer satisfaction with voice services is not usually part of data management systems. Service-level reporting must be added to address degraded performance issues, create improvements and efficiencies and enable capacity and contingency planning.

The goal for voice services is consistent high performance under varying network conditions. Service-level reporting is the only way for the MSP to have the necessary visibility across the customer's IPT environment. Obtaining this view allows the MSP to validate and measure the success of a customer's IPT deployment and provide key stakeholders with the critical information they need.

## About PROGNOSIS

PROGNOSIS is a specialized management solution designed to monitor the performance of IP telephony as a business service across hundreds of PBXs and hundreds of thousands of phones. Providing an in-depth, unified view across Cisco, Avaya and Nortel IP telephony environments, it simplifies the managing of multi-vendor and multi-version IPT technologies.

Through intelligent alerting, access to thousands of IP telephony-specific metrics, deep diagnostics and comprehensive reporting, PROGNOSIS helps ensure the highest possible call quality and reliability. This provides the insight needed to identify and resolve issues before they impact the business or its customers.

### PROGNOSIS IP Telephony Management Reporter

PROGNOSIS IP Telephony Management Reporter provides a flexible reporting solution for enterprise and service provider environments. It extends the real-time performance monitoring of PROGNOSIS IP Telephony Manager and produces customizable reports spanning the four fundamental reporting areas this paper has identified: service levels, capacity planning, voice quality and IPT analytics.

#### Key capabilities:

- > Reports can be run for any time period from one day to 12 months.
- > Reports can be scheduled to generate automatically or be produced on demand.
- > Reports can be automatically distributed via e-mail or posted to a file share or web portal.
- > Report content can be modified and unwanted detail removed.
- > 13 different reports are configurable across any timeframe and interval precision.
- > Reports can be **private labelled** with the MSP's information.

### Value for the Managed Service Provider

- **Provides key stakeholders with critical information they need:** PROGNOSIS IP Telephony Management Reporter provides out-of-the-box reports designed to address the specific requirements of stakeholders tasked with managing IP telephony, including network, operations, telecom managers and capacity planners.
- **Increases efficiency through automated report generation and distribution:** PROGNOSIS IP Telephony Management Reporter reduces the time involved in preparing and distributing reports for individual stakeholders by automatically generating and distributing reports to individuals at regular intervals. Reports can also be generated on demand for instant troubleshooting and analysis.
- **Improves planning, optimization and resource usage:** PROGNOSIS IP Telephony Management Reporter provides visibility into utilization trends to help effectively plan for future capacity needs and to identify inefficient use of existing infrastructure. It also provides visibility into the history and occurrence of service level breaches, so that issues impacting the business can be addressed accordingly.
- **Offers flexibility and scalability to report across multiple customers:** Reports from PROGNOSIS IP Telephony Management Reporter can be produced for any groups of devices. This will facilitate the automatic generation of per-customer SLA reports for service providers, hosted IP telephony providers, or ITIL-oriented enterprises.

- **Reduces overhead by simplifying management of mixed version and multi-vendor environments:** Increasingly, MSP staff need to manage IP telephony solutions from multiple vendors, or different technology versions from a single vendor. PROGNOSIS allows organizations to monitor and manage mixed versions of Cisco, Avaya and Nortel IP telephony technology through a single user interface and skill set. This reduces training costs and the need to employ expensive vendor-specialized personnel.

**Author biography**

Gary Audin, [delphi-inc@att.net](mailto:delphi-inc@att.net), has been a communications and security consultant, author and educator for more than 40 years. He has advised enterprises, vendors and venture capitalists in North America, Caribbean, Europe, and Asia. His publications can be found at [www.nojitter.com](http://www.nojitter.com), [www.webtutorials.com](http://www.webtutorials.com), [www.acuta.org](http://www.acuta.org) and [www.searchunifiedcommunications.com](http://www.searchunifiedcommunications.com).