

Avoid Three Common Pitfalls with VoIP Readiness Assessments

Enterprises and equipment vendors are learning the value of a complete readiness assessment before deploying VoIP across an organization. The assessments are a critical step to a successful VoIP deployment, but many enterprises are hitting three common pitfalls with various assessment approaches. This white paper will focus on how to avoid the pitfalls of following a snapshot approach, believing synthetic VoIP calls are sufficient and focusing on the assessment only and ignoring post-deployment management. The paper will reinforce why readiness assessments are key for a successful VoIP deployment while also highlighting best practices to assist enterprises in successfully deploying VoIP.

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Avoid Three Common Pitfalls with VoIP Readiness Assessments

Overview

Over the past several years as enterprises have been deploying voice over IP (VoIP) with more frequency, many have learned the hard way that the first step in the VoIP lifecycle process should be a complete assessment of network readiness. Too often, IT organizations fall into the stereotype of “let’s put it on the network and see what happens.”

As convergence grows, the “let’s see what happens” approach with VoIP will likely not be successful. While it’s a data application at the core, VoIP does not act like traditional data applications. And for most enterprises, VoIP will be the highest profile application on the infrastructure. What this means is: if the phones do not work, everyone will know.

When VoIP deployments were more “bleeding edge,” many enterprises had major issues with initial rollouts. One key reason was a lack of assessment. When there were initial problems, the battle waged between the enterprise, VoIP equipment vendors and service providers. Many VoIP vendors, who took the brunt of blame for poor performance, are now requiring network assessments even before they will sell or service the IP PBX and phone systems.

While this is a good first step, many enterprises are falling into three common pitfalls when it comes to assessments.

- Snapshot approach – A one-time assessment provides analysis for that point in time. However, networks and applications are extremely dynamic, so what may be true today is irrelevant two months from now when deployment actually occurs.
- Synthetic VoIP calls are not enough – Many groups are using synthetic calls exclusively to test readiness. While this approach gives visibility into how voice may perform, it provides little view into how the voice and data applications are impacting each other on the shared infrastructure.
- Focus on assessment and ignore post-deployment management – Assessments tend to only help with evaluating readiness. Enterprises are spending several thousand dollars per site for this, but do not have a plan for ongoing management after VoIP has been deployed.

This white paper will reinforce why readiness assessments are key for successful VoIP deployments while also highlighting best practices so your organization can go from “rolling out VoIP” to “implementing VoIP successfully across the enterprise.” Pre-deployment assessments should only be the first step in a successful VoIP deployment, which also must include monitoring, management and optimization.

Snapshot approach

Stung by the initial failures of early VoIP deployments, enterprises are seeing the value of assessments. Many organizations are now buying services from VARs, integrators, and VoIP equipment vendors to test readiness. In most common scenarios, the assessment usually includes approximately 2-4 weeks of analysis. The analysis will likely include synthetic VoIP transactions (synthetic calls will be discussed more in the next section) on the existing network to gauge readiness.

During this phase of the lifecycle, the analysis will likely include a set number of calls to be sent across the network and will provide information like mean opinion score (MOS), jitter, packet loss and latency for the calls. These numbers will be evaluated and a recommendation of network readiness will be calculated and provided. Once this is completed, the assessment is over.

The last statement is the most crucial. When do you assess your network? How long will it take from assessment to actual full deployment? What changes could impact your organization in the meantime – new users, new applications, increased usage, new locations? All of these variables highlight why a single assessment is not sufficient.

Many enterprises understand the network and applications are constantly changing, but if the organization is paying several thousand dollars per site for a consulting assessment, they are not likely to do continuous assessments (assessments can range from \$2,000 (US) to tens of thousands of dollars, depending on size, complexity and length of evaluation).

What is shocking for many enterprises is that several vendors will void assessments they completed if changes – like new applications – occur on the network. In today's dynamic world, changes in the network happen frequently. Now enterprise's costly assessments are no longer valid and they must decide whether to reassess at the same cost.

Successful organizations must find a way to not only do an initial assessment for VoIP, they must find a cost-effective and user-friendly way to continuously monitor readiness for VoIP in the bursty and high-demand converged networking area. The snapshot approach does give a view of how things look today, but since VoIP deployments typically occur over a period of months or quarters, enterprises must consider how to have dynamic and on-demand assessments without raising the cost several times.

Synthetic VoIP calls are not enough

Many enterprises and consulting services fall into an easy trap of doing just synthetic call generation during the assessment. The trap occurs because this analysis is typically the easiest to deploy. As we have learned in the past several decades, the easiest solution usually is not the best solution when it comes to complex architectures and business-critical applications and networks.

There are three approaches to VoIP assessment for the network, each with their own pros and cons.

- Synthetic testing
- Polling-based analysis
- Granular converged performance

Synthetic testing

With synthetic testing, an appliance or software agent generates “fake” VoIP calls and measures the performance across the network. This approach can provide detail like MOS, R factor, jitter, packet loss or delay for each call. If the call performance is above acceptable, the network is deemed ready. If the performance is below quality metrics, changes in the infrastructure should occur before deployment.

The pros associated with this approach are focused on the ease of deployment with quantifiable metrics. This approach is typically the easiest to deploy.

The cons associated with just synthetic calls include not understanding how the VoIP traffic impacts data and vice-versa. In addition, while the metrics include criteria such as delay, synthetic transactions cannot pinpoint what is causing issues such as delay – is it the local loop, usage, carrier performance, class of service (CoS) settings?

Polling-based analysis

The second approach uses the quantifiable usage of VoIP to estimate readiness. For example, an enterprise plans on using the G.711 standard and sets up the quality requirements. With these assumptions, each VoIP call might require 64Kbps of bandwidth. So if a location is expecting five concurrent calls maximum, there should be at least 320Kbps of bandwidth available just for VoIP.

Using this approach, a polling-based solution focuses on using the existing infrastructure and polling standard MIBs which include average utilization for each device. With this information, the enterprise can attempt to calculate how much bandwidth is available and/or needed for each location.

The pros of this approach leverage the existing infrastructure to pull back information into a single application or server. It is probably the easiest way to gather basic statistics like usage.

The cons are tied to the lack of view for VoIP calls and the limited granularity of the information. This approach focuses on raw utilization and doesn't break traffic down by application, so there is no correlation of performance. Most polling solutions have between a five and 15 minute polling increment which can skew and flatten the bursty nature of data.

An example of this is monitoring two locations. Location A has a consistent 50% usage over the five-minute polling period. Location B has usage of 100% the first half of the period and 0% the second half (data traffic typically is bursty and has big spreads). A polling solution would say both locations have a 50% average. The skewing of the data could set a false sense of security because Location A may have plenty of bandwidth but Location B is bursting to maximum usage half of the time. If you deployed VoIP to Location B, there is a great likelihood of performance impact to both voice and data traffic.

Enterprises can increase the polling frequency, but there is a cost for this as well. This approach adds overhead to the network each and every time you go out and bring information back to the server or appliance. There is a fine line between getting more granular with polling and overburdening your network with management traffic.

Granular converged performance

The third approach of granular converged performance uses the quantifiable aspect of VoIP listed earlier, but with a different tactic. Instead of polling and averaging usage every 1 to 15 minutes, this approach focuses on detailed monitoring the network and providing up to a 1 second level of granularity. For example, instead of one data point every 5 minutes with a polling based solution, 1 second granularity gives you 300 data points in the same 5-minute period so you are able to see peaks and valleys with bursty applications.

The pros associated with this solution are the deep granularity it provides by actually monitoring and measuring every packet going across the network. It can also monitor voice and data on a converged network to see the impact of different traffic on other applications. With granular information, you can be more insightful when assessing readiness and taking corrective actions. Finally, the approach has the information at your fingertips when it is needed. A complete assessment can be used during evaluation as well as monitoring performance throughout the entire process.

The con with this approach is the requirement of a device or appliance at each location. It is impossible to collect this level of data and granularity without an appliance. Later in the paper, you will learn how the appliance can assist with managing performance after deployment.

Focus on assessment and ignore post-deployment management

Several years ago, most industry experts would have said lack of assessment was the biggest weakness in VoIP deployments. Today, the same analysts would likely say ongoing management in a converged world is the biggest issue. A recent study found most enterprises do not plan for management tools, but deploy them 12 to 18 months after problems start occurring on the network.

A major challenge in today's converged world is that many enterprises are combining applications and networks, but are not bringing the voice, data, application, IT and infrastructure groups together. Too often the voice group must replace the legacy phone system and starts the migration to VoIP. The data or networking group is not aware of impending change or the potential impact. And of course, everyday business continues where new applications and increased usage occurs.

VoIP will raise the level of attention of poor performance. In the best-effort world of data applications, most users will never notice or complain if an e-mail takes 10 extra seconds to send or web applications are a little slow. However, with VoIP, users will immediately notice degradation and likely complain. This increases the exposure and risk to your IT organization. This exposure adds to the criticality of ongoing performance management for both voice and data applications.

Best practices in VoIP assessments

This section will focus on best practices on assessing your network for VoIP – primarily across the wide-area network and multiple locations. There are other best practices in the VoIP lifecycle that should be addressed including physical plant/cabling, power over Ethernet (PoE) and local area network configuration.

Not surprisingly, the best practices include not falling into any of the traps listed above. For network readiness, there are four factors you should follow in consistent order:

- Baseline bandwidth and performance requirements
- Add VoIP calls
- Manage and monitor converged voice and data
- Optimize performance/make change decisions

Baseline bandwidth and performance requirements

Many enterprises implement VoIP trials before assessing bandwidth and performance requirements such as delay, packet loss and jitter. For any successful assessment, baselining before deployment should be the first step. Take the time to have granular visibility into your network before you add VoIP (or any other application).

The key reason for baselining is if you are not certain of what is happening across the infrastructure before you add VoIP, you will not know if degradation is due to the VoIP rollout or was already there before deployment and VoIP just heightened the awareness.

To baseline, you need granular information to see potential impact areas including site usage, delay, packet loss, jitter – all things that can impact a real-time application like VoIP.

Once you baseline your network, you are ready for the next step, add VoIP calls.

Add VoIP calls

Once you believe your network is ready, you can add VoIP calls to your network to test how your existing infrastructure handles converged applications. As an enterprise, you have a choice of doing a VoIP trial with actual voice calls or using synthetic calls. Each has its own pros and cons. A VoIP trial using real calls will provide you specific results and reaction from users which can provide valuable insight, but you need to monitor closely if the trial may negatively impact the end-users' business-critical responsibilities. The synthetic calls reverse the pros and cons, end-users aren't impacted during the trial, but you may lose the qualitative response from real users.

In this step, you have a choice of one or both approaches for trialing VoIP calls depending on your requirements and goals. The goal of adding VoIP calls to the network is seeing how the applications work together in a converged network and if the change to your network negatively impacted your baseline analysis – which takes you to step three.

Manage and monitor converged voice and data

Now that your network has both VoIP and data, you need to manage and monitor the performance of each. With VoIP, you want to monitor call performance metrics like MOS and R factor, but more importantly what is impacting the call quality.

For many enterprises, there is another common pitfall in ongoing performance management. Virtually all of the major IP PBX vendors offer an enterprise management software solution for managing the VoIP performance across the platform deployed by the enterprise. These software packages can track down to individual calls and provide details including source and destination phone numbers/IP addresses, call duration, call set up, MOS, packet loss, delay and jitter. Enterprises are lured into a false sense of security with views like this.

These types of management systems are missing two key aspects most enterprises deem critical – troubleshooting individual call performance and managing a converged network of data and voice applications. As discussed earlier, the key question for most organizations is not "What is the MOS?" but "What is causing the quality degradation and how can it be fixed?" The IP PBX enterprise management solutions do not help with identifying and isolating which aspects are impacting critical factors like delay, jitter and packet loss. An ongoing management system should be able to answer this type of question. If you cannot isolate and pinpoint the cause of degradation factors, you will have little luck in fixing any problem.

The enterprise must also look at the converged applications and see the relationship between voice and data apps. Most organizations make a mistake by focusing just on VoIP because of its real-time requirements, but most organizations have several business-critical applications that cannot be degraded either. Once you have visibility in the performance to identify, isolated and resolve individual problems, the fourth and final step is next.

Optimize performance/make change decisions

Now that you are armed with the knowledge of how the VoIP deployment impacted your network and the actual calls are performing, you have the ability to make change decisions.

If you are having performance issues, maybe you need to add bandwidth or want to go to an MPLS-based offering with CoS capabilities. Maybe your infrastructure needs updating.

Now you can make informed decisions and then have the ongoing monitoring capability to see how your changes impacted performance. This is paramount with the VoIP management lifecycle because as we discussed before, things will change with your network and applications and you must be ready to see what happens if things like a new application is required.

A solution to meet your VoIP assessment needs – Visual Performance Manager

Throughout this paper, several aspects were highlighted showing why assessment and ongoing monitoring are needed for a successful VoIP deployment. You will need a system to provide the critical visibility to successfully deploy voice and manage it post deployment.

For IT management responsible for maximizing the value of infrastructure investments including VoIP, Fluke Networks' Visual Performance Manager is the integrated network management solution that provides broad visibility and deep analysis into your network by consolidating granular views from multiple network sources into one seamless view tailored for each user's needs.

With Visual Performance Manager, you can avoid the mistakes listed earlier and properly manage your network and deployment.

Benefits of the system include:

- A single system for upfront assessment as well as ongoing management. For about the investment cost of a traditional assessment, the system can do that as well as stay on the network post-deployment for management.
- Up to one-second granularity for critical assessment and monitoring.
- Tracks individual VoIP calls with details including to and from MOS, CoS settings, degradation factors including jitter, packet loss and delay on a per call basis.
- Monitors all applications regardless of location and service provider.
- Ability to combine active synthetic testing with passive monitoring or actual calls for complete visibility
- Leverages tight integration to determine what is causing degradation with complete visibility from layer 1 through 7.
 - Ability to go "back in time" to find calls that happened minutes, hours, days or weeks ago to see if a problem was a one-time occurrence or an intermittent problem that is growing over time.

Conclusion

Enterprises are increasingly realizing the value of readiness assessments but must avoid common pitfalls including the snapshot approach, limitation of just synthetic calls, and not implementing an ongoing monitoring and management strategy. If the four-step best practice approach discussed in this paper is followed, the experience of deploying VoIP will go from simply "deployed VoIP" to "deployed VoIP successfully."

In today's converged world, you need visibility of both voice and data to see and understand how they interact. With Visual Performance Manager, you can get a complete solution that includes up-front assessment as well as ongoing monitoring and management for about the price of a one-shot, third-party assessment. The key to having a successful voice deployment is to build a strong foundation across the distributed enterprise.

For more information on Visual Performance Manager, please visit www.flukenetworks.com/vpm. To learn about our Network SuperVision Solutions, call 800-283-5853 (US/Canada) or 425-446-4519 (Other locations) or email info@flukenetworks.com



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