

# VoIP SERVICE PROVIDERS STUDY

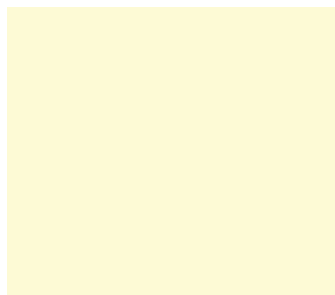
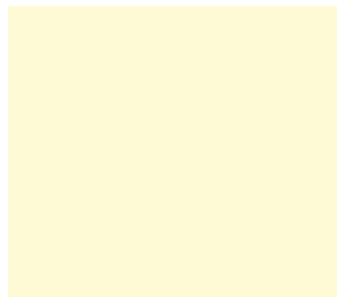
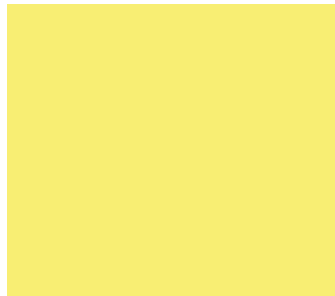
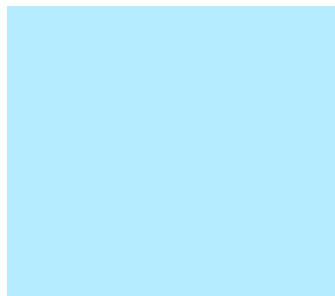
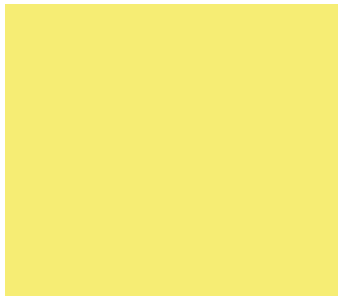
Wave 5

Service Level Rankings

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Abstract



## Keynote VoIP Competitive Intelligence Study Overview

April 2008, Keynote Systems reports the results of Wave 5 of its Voice Service Quality Competitive Intelligence Study to evaluate how end-users perceive the core reliability and audio clarity of leading voice service providers. The study compares the relative performance of PSTN (regular analog) service, Broadband VoIP providers (e.g. Vonage, Verizon VoiceWing, EarthLink trueVoice, at&t CallVantage etc), and cable voice services (e.g. Time Warner Digital Phone, Comcast Digital Voice). Test calls were placed from residential locations in New York and San Francisco.

Keynote - an independent, trusted authority on Internet performance – conducts benchmarking studies for various industries, to assess the experience of end-users with key applications. Prior to Wave 5, Keynote has previously released four Voice Service Quality Competitive Intelligence Studies, in July, 2005, January, 2006, September, 2006 and August 2007. Each of these studies evaluates critical performance factors that affect the consumer’s experience with each voice service. The previous four Wave study reports, widely quoted in industry publications and leading newsletters worldwide, have already helped service providers identify the top performers in the voice services market and helped them to focus on the key service level objectives that will enhance their end-user experience.

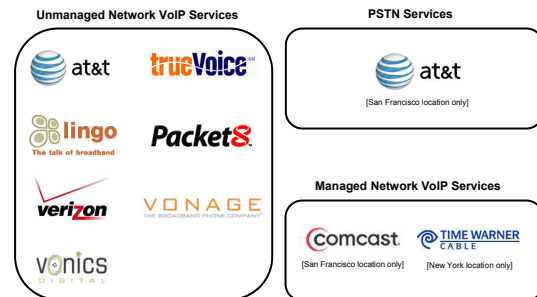
A study out of London says the total revenue for the [U.S. Telecom industry has hit \\$1 trillion and VoIP is emerging as a considerable share](#). The number of landline customers continues to erode, but [cable VoIP](#) growing at about 75 percent.

Even so, VoIP reliability and audio clarity remain important factors that limit the widespread adoption of VoIP. How can VoIP providers in the residential and SMB market overcome consumer perception of poor reliability and call-quality and live up to the dial-tone quality that consumers have come to expect over the years? Keynote’s Competitive Intelligence study reveals the facts that help VoIP providers overcome the quality barrier relative to traditional phone service. Keynote evaluates audio quality as well as underlying network performance - whether DSL, or Cable - that affect the end-user experience and compares them across various VoIP service providers and traditional phone service. With this insight, Keynote provides actionable recommendations to help improve end-user facing service quality and capitalize on growing market adoption.

A poor end-user experience is one of the major factors for customer attrition and churn. The data and recommendations provided by these studies have helped voice services providers in addressing one of the key concerns to their profitability – identifying and monitoring customer pain points related to the service level quality of their offering.

## Study Participants

Keynote measured and evaluated the performance of the following twelve consumer voice service providers as part of this competitive intelligence study. These providers all offer service in the San Francisco metropolitan area or the New York metropolitan area, or both:



## Wave 5 Study Objectives

- Rank the relative performance of PSTN, PacketCable, and VoIP service providers.
- Identify the industry trends in service level performance.
- Identify the strengths and weaknesses of each service provider and voice service technology.
- Identify the range of performance for each Key Performance Indicator between the best voice service providers and the worst.
- Examine peak and prime-time performance variations.

## Overall Best VoIP Service Providers

Keynote ranked VoIP Service Providers in two categories: Reliability and Audio Quality. The Service Availability, Call Completion, Average Answer Time, and Dropped Audio performance factors all contribute to the Reliability ranking. This high-level ranking identifies which voice service providers are providing the most reliable end user experience. The Audio Quality ranking is computed as an aggregate of the performance factors related to audio clarity and audio delay. This high-level ranking identifies which service providers are providing the best sounding and highest quality voice audio to their customers.

## Summary of Wave 5 Results

Keynote ranked voice service providers in two categories - Reliability and Audio Quality. Service Availability, Call Completion, Average Answer Time, and Dropped Audio performance factors all contributed to the Reliability ranking. Measured Mean Opinion Score (MOS) and Audio Delay values contribute to Audio Quality ranking.

In addition to the overall ranking of voice service providers, each service is analyzed in depth to identify its strengths and weaknesses. The overall analysis focuses on ten Key Performance Factors. The ten Key Performance Factors are:

### Reliability

- Service Availability
- Call Completion
- Average Answer Time
- Dropped Audio

### Audio Quality

- Average Audio Delay
- Audio Delay Acceptability
- Audio Delay Variability
- Average MOS (Mean Opinion Score)
- MOS Acceptability
- MOS Variability

Each Key Performance Factor measures a distinct aspect of call performance; as illustrated by the selection of results presented below. It is rare for a single voice service provider or network carrier to excel in all ten aspects. Keynote's Competitive Intelligence Study Report presents detailed analysis and results for each service provider.

## General Observations

- Consumers are more likely to experience tolerable, rather than completely satisfactory, audio delay on calls.
- One VoIP provider had no calls measuring a MOS of 4.0 or better; the best a consumer on this service can hope for is merely tolerable audio clarity.
- On one VoIP provider, every call had an audio delay of more than 150 ms, increasing the likelihood of conversational disruption.
- One VoIP provider required six seconds more than other VoIP provider to connect calls after dialing.
- There can be large gaps between VoIP providers on unmanaged networks and other service providers

## Reliability Overview

In the wave 4 study report, PSTN service providers were more reliable than the competition. In wave 5, PSTN continues to lead the pack in reliability, with Time Warner's Digital Phone service only two points behind.

Provider	Reliability Points	Rank
AT&T PSTN	944	1
Time Warner Digital Phone	942	2
Verizon VoiceWing	806	3
Provider D	775	4
Provider E	700	5
Provider F	623	6
Provider G	610	7
Provider H	597	8
Provider I	538	9
Provider J	182	10

## Audio Quality Overview

In the wave 3 study report, PacketCable service providers had slightly better overall Audio Quality than the competition, but that is no longer the case. In wave 4 and again in wave 5, Keynote reports that the PSTN service providers outperform the competition when it comes to delivering great sounding call audio with minimal delay.

Provider	Performance Points	Rank
AT&T PSTN	840	1
Comcast Digital Voice	805	2
Time Warner Digital Phone	561	3
Provider D	472	4
Provider E	469	5
Provider F	460	6
Provider G	455	7
Provider H	454	8
Provider I	437	9
Provider J	73	10

The Audio Quality index ranking is based on Keynote extensions of the [Apdex](#) standard to represent user satisfaction with audio quality:

$$1000 \times \frac{\text{Satisfied count} + \frac{\text{Tolerating count}}{2}}{\text{Total samples}}$$

Each call is determined to be in the Satisfied, Tolerating, or Frustrated performance ranges for MOS and audio delay, based upon industry standard thresholds

## Results Availability

The study results are available in two formats:

- An overview report, which reveals general industry trends and highlights the performance of only the best voice service providers. The insight gained from this competitive intelligence helps executives identify general areas of service improvement that will have the maximum impact on customer experience.
- A detailed report that analyzes each of the ten service providers and each of the ten performance factors in greater depth. The detailed presentation includes analysis of the data across service providers, last-mile network connections, and geography. Armed with this intelligence, IT Managers can tune specific aspects of their VoIP service to provide better performance to customers than their competition.

## About Keynote Systems

Keynote Systems, Inc., the Mobile and Internet Performance Authority is the worldwide leader in eBusiness performance management services. Over 2100 corporations and 19,000 individual subscribers rely on Keynote's growing range of measurement, monitoring and customer experience management services to improve eBusiness performance by reducing costs, improving customer satisfaction and increasing profitability. Keynote's products provide enterprises with the tools to align IT and Business goals. To learn more about Keynote's Competitive Research studies, please visit: [http://www.keynote.com/keynote\\_competitive\\_research/](http://www.keynote.com/keynote_competitive_research/)

## Custom Comparisons

Not included in the study? Need to see where you rate against the top providers? Keynote can create an expansion study to collect the same metrics on your service, and profile your results against the providers in this study.

## Service Level Rankings Methodology

