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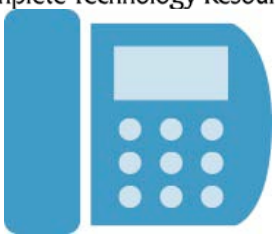
CTR's Hosted PBX
Technical White Paper



Hosted PBX

OVERVIEW

CTR's Hosted PBX offers an enterprise-grade phone system that's delivered to small and medium-sized businesses via the same, reliable cloud infrastructure as its other hosted services—including hosted Exchange and Cloud Server.

Hosted PBX uses Voice over Internet Protocol (VoIP) technology to provide your staff with enterprise-grade telephone service and features, as well as mobility and conferencing tools, for a flat monthly per-user fee. Hosted PBX simplifies management and scaling through a powerful and intuitive web-based control panel. In addition, it eliminates the worries of an on-premise phone system with its superior on boarding and support.

Hosted PBX also integrates with CTR's suite of office productivity solutions to let you further improve staff communication and streamline billing, management and support.

Your phone service is critically important to you. You can rest assured that CTR has applied its cloud services knowledge and experience to ensuring performance, availability and security of its Hosted PBX infrastructure.

Focus your business on growth with phones from the cloud. Get started:
508-909-5961 x201

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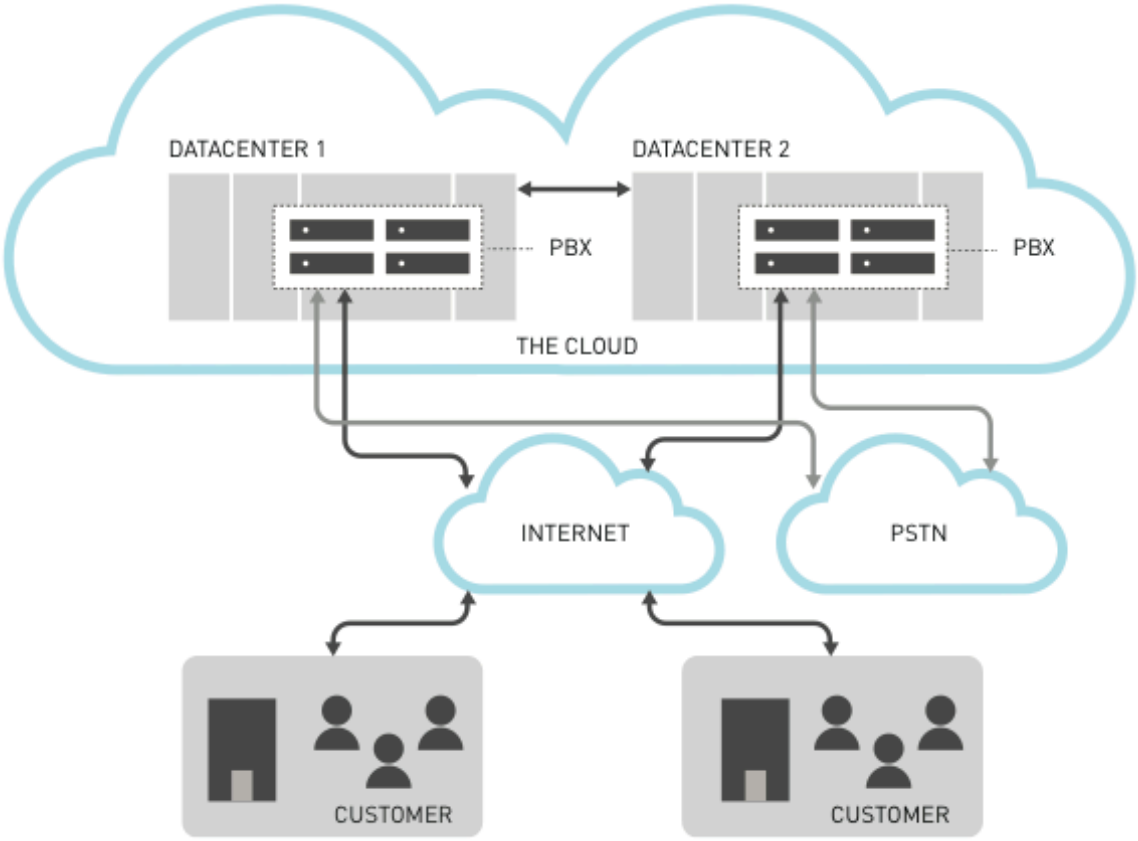
HOW HOSTED PBX WORKS

VoIP technology uses the Internet to route telephone calls between end points. On the customer side, your voice traffic passes through your router to the Internet, where CTR's Hosted PBX directs it to and from any landline or mobile telephone number.



CTR's Hosted PBX uses the industry standard Session Initiation Protocol (SIP) to set up calls between phones. It supports the G.711 and G.722 codecs to deliver crisp, clear voice quality.

To ensure the highest reliability, CTR's services are provided via a redundant, geographically distributed infrastructure and are hosted in top-tier, SSAE16 Type II compliant datacenters. Each datacenter has redundant electrical and cooling infrastructure, including diesel generators for backup power.

CTR connects each of its datacenters to the Internet using multiple tier 1 Internet providers such as Global Crossing, Level 3, Sprint, and UUnet. This redundancy ensures availability and facilitates routing traffic around occasional Internet provider backbone issues.

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PBX SERVICES

The PBX portion of Hosted PBX, which delivers calling features and customer-specific call routing, is a robust service built by CTR on an open-sourced, standards-based soft switch. The PBX runs on a Linux server, using a VMware hardware platform.

Within its datacenters, CTR uses high-availability hardware and network components to guard against common outages that might be caused by hardware failure or storage network failures. In the unlikely case of a major datacenter disruption, it is able to restore PBX services from another datacenter within minutes.

NETWORK SERVICES

CTR connects to the PSTN (Public Switched Telephone Network) through a carrier subsidiary. This subsidiary also uses high-availability hardware and network components for interconnectivity, with automatic failover to secondary network connections in the case of an outage. This highly-redundant, geographically diverse architecture allows CTR to ensure voice traffic will still be delivered uninterrupted in the event connectivity to the telephone network is lost.

CALL QUALITY

CTR architected the Hosted PBX service in a number of ways to ensure the best possible call quality:

- Hosted PBX service components are placed as close as possible to the edge of CTR's network, minimizing the number of steps through which VoIP packets must travel and thereby reducing the possible impact of latency on call-quality.
- CTR utilizes a large-pipe network to deliver plenty of capacity for VoIP calls.
- CTR's network is over-provisioned to ensure bandwidth is always sufficient for peak demand.

A company using Hosted PBX should review its own network to confirm that it is prepared to route, make and receive high quality calls. CTR recommends taking one of the following steps, in order of preference:

1) Deploy a separate Internet connection for VoIP and for data traffic. This minimizes contention for resources to ensure that voice traffic gets adequate bandwidth and that users receive consistent call quality.

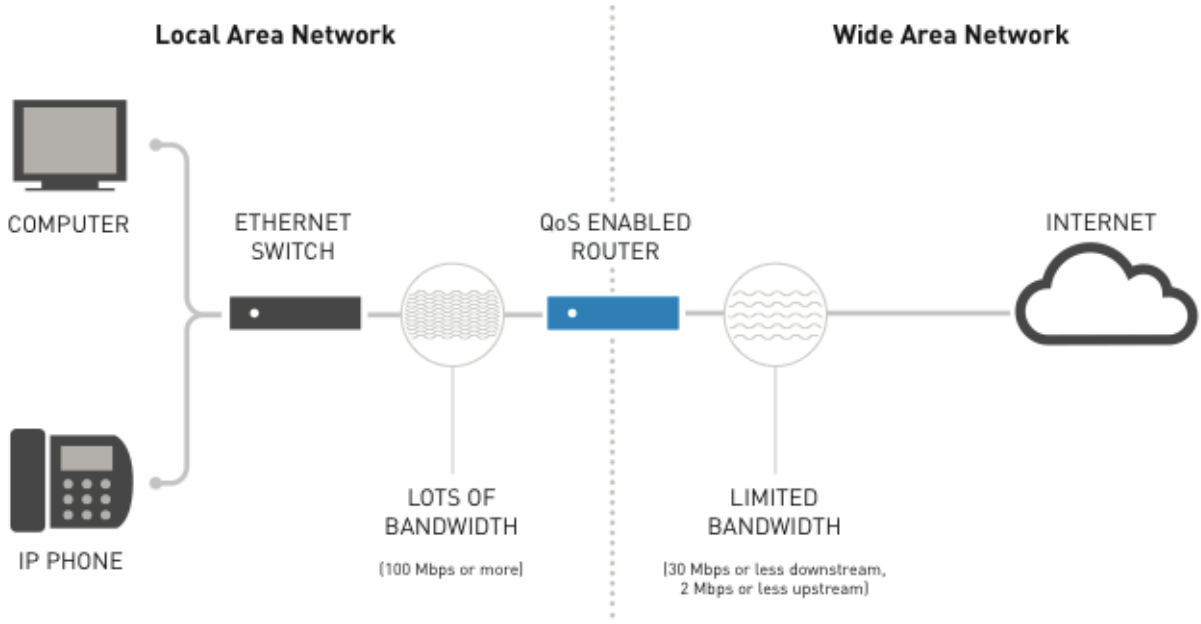
2) If option 1 is not feasible, businesses should deploy a router that supports voice Quality of Service (QoS) features. A QoS-enabled router will handle voice packets with higher priority, assuring call quality.

For both options above, it's very important to ensure that both upstream and downstream bandwidth are sufficient for the maximum number of simultaneous voice calls the company will expect. For example, while a site may have 20 users, it may expect no more than 8 of those users to be on calls at the same time. The Internet connection's bandwidth must be sufficient for that demand.

a. To calculate how much bandwidth is needed to support a site, multiply the maximum number of phones in the office that would be on a call at the same time by 100Kbps. For 8 users, 800Kbps would be required to handle voice in both the upstream as well as the downstream direction. (Upstream = outgoing direction, Downstream = incoming direction.)

b. Additionally, ensure the Internet service plan has enough bandwidth left over on a shared voice and data connection to handle the data traffic as well.

WHY QUALITY OF SERVICE (QoS) MATTERS



As the diagram above illustrates, a customer network typically has a considerable available bandwidth on the customer premise side (Local Area Network, or LAN) of the

network. It does not typically have as much available bandwidth on the Wide Area Network (WAN), or Internet side of the network. This is a function of service provider Internet package offerings currently available in the marketplace.

If a router is not able to prioritize VoIP traffic, it will offer bandwidth to any application that requests it. If there is more demand for bandwidth from the LAN than is available on the WAN, the router will randomly discard or buffer packets it is receiving. This discarding or delaying is acceptable for data applications, because these applications are not as time-sensitive as voice. But packet loss or delay can degrade voice call quality.

Most Internet providers offer a Business Class service with sufficient bandwidth. This package should be considered.

SUMMARY

CTR's Hosted PBX provides an enterprise-grade phone system that's delivered to small and medium-sized businesses via the cloud. Hosted PBX's infrastructure and network have been architected to optimize call quality and user experience. Unlike on-premise systems and other hosted VoIP solutions, CTR's Hosted PBX offers the cost structure, feature richness and worry-free experience to ensure that as your business grows and changes, your phone system keeps pace.

If you have any questions about bandwidth, QOS routers, or any other elements of Hosted PBX, please contact CTR at 508-909-5961 x201.