Beyond High Availability for Asterisk Based Contact Centers

Voice Solutions for Mission-Critical Contact Centers
That Offer More than High Availability

Voice communication is the primary medium in multi-channel contact center solutions. It is also the most effective since synchronous communication directly addresses issues that require attention and detail. Even organizations with a brick and mortar establishment for sales operation have moved all significant customer interactions to back offices that are accessible through a customer facing contact center. These back office administrations are the operational hubs. It is therefore not surprising that businesses are looking to set up mission-critical contact centers using highly reliable voice solutions that offer flexibility and a high level of functionality.

"Modern IP based voice solutions have lowered the barriers to adopting Cloud contact centers technology, allowing improvements in flexibility and reliability"

Modern voice solutions are flexible and include technologies that allow the contact centers to handle customer interactions with tools and processes that are geared for optimizing performances. These processes and tools are combined into a single, unified solution, capable of providing a holistic view of customer interactions across multiple media types. They include many sub-technologies whose interactions are significantly complex.

IP based Cloud voice solutions requires a sophisticated technology stack with different technologies having to interact for the contact center to function properly. Voice over IP (VoIP) communications require software, hardware and network technologies to function without encountering failures. On top of this, large contact center solutions carry out millions of transactions that may introduce performance strains to the point of leaving the system inoperable. Therefore, conventional planning based on expected mean time between failures of different sub-components is not a useful way for keeping VoIP systems operational. Since VoIP treats voice as another form of data that can be

carried over the Internet, high availability solutions use redundancy and failover as an effective safeguard against downtime. Let us look at this carefully.

High availability for most information systems mean ensuring the availability of the system for use at all times. This is typically managed by setting up redundancy for all subsystems and having the capability to detect failures, bringing the redundant sub-system into play when an active sub-system fails. The data used by the subsystems should be current. This is handled by data replication.

VoIP-based contact center systems predominantly use Session Initiation Protocol (SIP) where clustering sub-systems make it possible to move IP traffic. Setting up a main and standby Asterisk for telephony servers, having replication setup for databases, and enabling load sharing for web servers makes ensuring continuous availability of a subsystem possible. Upon detection of any failure in an active subsystem, the HA monitoring software will perform the tasks required for the standby subsystems to take over the active role. HA monitoring is complex and requires the use of some form of heartbeat mechanism, whose "heartbeat", when not received within a specific amount of time, will trigger the monitoring software to act. The sophistication of the monitoring is dependent on the level of confidence generated by the verification mechanism. We can see the level of complexity involved in setting up a HA mechanism for a contact center software that also includes an automatic call distribution (ACD) software system along with all the other subsystems mentioned above.

Assuming that we are success in setting up a HA system for an Asterisk-based contact center using the methodology mentioned above, it has one glaring deficiency. Telephony systems and call center operations are not mere data systems using IP traffic. Arrangements to ensure immediate availability of the subsystems are inadequate in ensuring the continuation of the phone conversations that were underway when a hardware or software failure occurred.

Call Survival: Taking the Next Steps in High Availability

The Request for Comments (RFC) 3261, published by Network Working Group of the Internet Engineering Task Force (IETF), describes the Session Initiation Protocol (SIP). SIP is an application-layer control (signaling) protocol for creating, modifying, and terminating VoIP phone calls. The SIP protocol is used to register SIP devices (phones) as well as create and tear down sessions between SIP peers. Among other things, session descriptions allow participants to agree on media and transport information (type of media, format, protocol, address) and timing information.

When a VoIP call is established and ongoing, a disruption to the SIP session results in termination of the call, resulting in the end of the voice conversation. SIP sessions for voice calls initiated by a SIP peer travel through many peer-to-peer handshakes before reaching the final destination for a call setup, resulting in a phone (voice) conversation. A failure in the phone switch (PBX) associated with the contact center solution will end all on-going SIP sessions and associated voice conversations. With a contact center ACD controlling the PBX switch for routing of the queued calls, the PBX will not directly know the internal end-point of the calls.

US Patent US20110310773 A1 - "Method and system for fail-safe call survival" offers the technology to recover calls and successfully continue ongoing calls and conversations in the event of a single point failure within an IP-based phone and contact center system. It is a mechanism that handles the revival of all the on-going and in-progress SIP sessions. It also addresses the issue of restoring the calls back to the same end points within a contact center solution where an ACD controls the PBX.

Benefits: Call survival over HA for Asterisk

The rise of Asterisk over the last decade has revolutionized telephony for both enterprise communications and contact centers. Technology managers have realized that Asterisk meets and exceeds the complex demands of voice solutions required for enterprises at a fraction of the cost of legacy systems. Asterisk is a complete media server, a protocol gateway, and a conference bridge. Above all, it is open enough to let the technology providers to take complete responsibility for solution development. By incorporating Asterisk as the underlying telephone switch, the developers of call center software and unified communications for enterprises can focus on higher level functionality and sophistication.

Most HA for Asterisk-based systems install and manage a cluster where they detect failure and automatically transfer control, resulting in a telephony environment with minimal down time. This is typically driven by software, with switchover in seconds. The network management control with dynamic IP address sharing or takeover between peers allows the switch from a failed server. Replication and synchronization between servers is done with some periodicity.

This type of HA leaves gaping holes in the enterprise strategy for handling failures in Asterisk-based systems. Contact centers, especially for mission critical applications will require more than a cluster-based HA strategy with rerouting of

the IP traffic. Call survival for Asterisk was developed to bridge this gap and provide a solution that goes beyond the industry standard of HA for Asterisk.

Call survival offers Asterisk-based contact centers and unified communications is a seamless mechanism for continuing the existing voice conversations during a failure. It is a culmination of years of work in understanding the technology behind VoIP and Asterisk and resulted in the US Patent US20110310773 A1 - "Method and system for fail-safe call survival,

HA Monitoring: Overseer Watchdog for Call Survival

A monitoring system has to be fail-safe and state-aware of the components. The fail-safe aspect requires the monitoring system to be self-correcting to overcome failures within the monitoring mechanism as there is no other external sub-system watching it. The monitoring mechanism has to be fully functional at all times, without which HA and call survival are at risk.

The self-awareness of the system is based on a sophisticated Overseer Watchdog system. The Overseer takes decisions and automates the process of failover whereas a watchdog keeps an eye on the heartbeat and pulse specific to the individual the sub-systems under its watch. Every physical server in a multi-server setup has an Overseer-Watchdog, with the Watchdog enabled for monitoring the server and the specific services as a part of the call center software deployment. All the Overseers are daisy-chained in an innovative method to allow anyone of them to be the main active Overseer with others areas standby with a pecking order. The built-in mechanism ensures that the top one is the main overseer and the next in command is always ready to take over. Therefore the servers whose services influence the voice media path are set to lower overseer order.

Overview of Overseer Watchdog Functions

Scaling with Asterisk-based contact centers is a requirement of multi-server installations. This is especially true when setting up Cloud voice solutions for multiple tenants. With a server, the watchdog has to watch both the hardware and the services. Therefore what is monitored on each server is configurable. The Overseer status page is a monitoring dashboard that will indicate the current status of services configured on every server, and also provide a test history for services. The individual services required to run the call center ACD have their own set of tests and thresholds. For example, SIP and Asterisk Manager Interface (AMI) tests are special sensitized tests, product of many years of field experience to avoid false positives. There are other individual tests like the MySQL replications that would generate warnings.

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Overseer initiates the call survival based on the real-time status of the watchdog tests. This is a finely-tuned mechanism that has to react, complete the failover, and continue the conversation before a human decides the phone conversation had died. This failover is accomplished following a process that ensures that individual phone calls can continue without the need to re-initiate any call.

Q-Suite 5.7 – Your contact center software with integrated call survival

Q-Suite 5.7 can offer call survival out of the box. Its major features are listed below.

Q-Suite 5.7 Product Features Matrix	
Features	Q-Suite 5.7
ACD with Skills Based Routing & Queue Prioritization	✓
GUI IVR Setup	✓
GUI Dialplan Builder	✓
GUI Script Builder	✓
Hot-Desking, On/Off Hook Agents	✓
Cloud- & Premise- Based Installs	✓
Mid-call Recovery for Fail-over	✓
High Availability for Redundancy	✓
TDM & VoIP Connectivity	✓
Multi-tenant	✓
Real-time Reporting	✓
Historical Reporting	✓
Voice Recording	✓
Quality Monitoring	✓
Campaign and List Management	✓
API for CTI Interface (.NET and Socket)	✓
Scalable Asterisk PBX with Voicemail	✓
Predictive Dialing	✓
Web Agent Interface and Native Client	✓
Do-Not-Call Compliance	✓
Open Access and Full Knowledge Transfer	✓

Conclusion

The paradigm change in technology has opened an unprecedented opportunity to build and deploy multi-tenant cloud voice solutions with exceptional functionality for driving productivity using UC solution and contact center platform. At the heart of this is the contact center software with a power ACD supported by a powerful telephony server. With Q-Suite and Asterisk, all these requirements are satisfied. When deploying this at any mission critical setup, it is inconceivable to deploy without a HA solution. With an overseer watchdog mechanism, you can go beyond HA for Asterisk cluster and offer the capability to continue conversations without the need to re-initiate the connection.

There are a number of resources to help you learn about the benefits of Asterisk. In addition to the reference materials available at www.indosoft.com, you can find valuable information here:

Asterisk Website
www.asterisk.org

Commercial Asterisk Support
www.digium.com

About Indosoft

Indosoft is a global provider of contact center software for Asterisk. It has been providing call center solutions to medium and large contact centers around the world for over ten years. It also licenses its ACD for Asterisk with .NET and socket library to enterprises utilizing Asterisk in their product line. Indosoft has been making available the Q-Suite ACD for private label contact center technology solutions.
Visit www.q-suite.com

Indosoft Inc.
334 Queen Street
Suite 201
Fredericton, NB E3B 1B2
Canada

(506) 450-7080 *Ext. 3*

www.indosoft.com