14 Ways Sangoma Makes Asterisk® Better

Sangoma is a market leader in open source telephony and has been a true pioneer, as well as an innovator, in this space for decades. Asterisk is a great telecom low-level engine that unleashes the talent and creativity of thousands of developers around the world. We at Sangoma are proud of our contributions to making Asterisk even better, by constantly improving the scalability, reliability and functionality of Asterisk- based systems. Many of the largest capacity, highest reliability, feature-rich, Asterisk-based systems are enabled by Sangoma hardware and software. We engineer, design and manufacture the highest quality interface expansion cards available for Asterisk and many innovative software capabilities that extend Asterisk into new areas.

While other major players have shifted their focus away from providing the best hardware for Asterisk, Sangoma remains firmly committed to this task and to your community. We continue to lead the way with more products that help push the density and reliability envelope, than any other vendor.

We were the first to introduce hardware-based echo cancellation, adjustable chunk size, an 8-span digital board, and many others. And more recently, while other companies are just maintaining their existing product portfolio, Sangoma has delivered the industry's first board capable of supporting 16-spans of digital telephony in a single expansion slot, a GSM Board, and the most accurate answering machine detection software available for Asterisk.

In spite of all this, much of Sangoma's contribution to Asterisk is still not fully understood by many people. The extensive technical innovations that are part of our Asterisk-focused products have become default components of what developers and integrators now expect of Asterisk generally. Many readers may not realize just how many Asterisk-related innovations, originated at and are still only available, from Sangoma. This paper summarizes the top 14 Sangoma contributions to making Asterisk EVEN better.

More than

20 Commercial Add-ons to FreePBX

#1 Making Asterisk More Usable

As mentioned earlier, Asterisk is a great development platform and countless developers are using it to build various telecom applications. However, many users simply want to use it as an enterprise communication system (AKA PBX). Being a development platform, it is quite hard to use and configure.

The FreePBX open source application builds on top of Asterisk to provide a rich graphical interface to configure a PBX. From dial plans, configuration of SIP phones, inbound and outbound routes, auto-attendant, voice mail, call center queues, etc. is all presented in a simple to use web based GUI. The FreePBX load is provided as an ISO image, complete with Linux operating system, Asterisk and the FreePBX application which means you do not need to spend time compiling source code or manually adding Linux packages and add ons. Simply install on a dedicated or virtual server and you are ready to configure and go.

Additionally, Sangoma provides more than 20 commercial add-ons to FreePBX ranging from management, reporting and enhanced value added services applications that further enhance functionality.

Examples such as:

» Endpoint Manager: provides easy configuration of more than 250 brands and models of SIP phones. Build provisioning files and templates, auto configure on phone power up based on DHCP option 66 and built in TFTP server. This is an essential tool for any deployments!

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» Q-Xact reports: configurable reporting tool for your call center queues. Track waiting time, work time, agent productivity.

» Outbound broadcasting and Appointment reminders. Ideal tool to simplify the scheduling of automate reminders (such as dentist appointemt) or to reach a list of people in case of emergency (school closing due to weather for instance).

#2 Making Asterisk More Scalable

A variety boards and software from Sangoma allow you to build bigger Asterisk systems on smaller servers.

Since its creation, Asterisk® has been known to require a lot of CPU resources when using the default DAHDI driver to communicate with installed VoIP-to-TDM interface boards. This increases the capital and operating expenses of the system.

Even with the most powerful CPU, systems can often show significant CPU load-related problems when running anything more than eight spans of digital telephony (T1/E1/J1) boards. By using multi-core servers, this number can be pushed to sixteen spans, but there is little CPU capacity to spare at this level of density.

Sangoma hardware and drivers alleviate this problem in several important ways. With Sangoma hardware, a single-chassis system running Asterisk can support up to forty-eight spans of digital telephony (1,440 simultaneous calls) without the risk of overloading the CPU. This reduces capital and operating expenses of the system.

Single-chassis system running Asterisk supports up to

48 Spans of Digital Telephony (1,440 simultaneous calls)

#3 Hardware and Drivers That Support Adjustable Chunk Size

Zaptel and DAHDI have always supported adjustable chunk size, but until Sangoma developed hardware that was specifically designed to work with adjustable chunk size, no one could take advantage of this important potential for efficiency gain.

In order to make Asterisk work with TDM interfaces, audio data must be transferred between the TDM Interface Boards that are installed in a system and the DAHDI API. The size of the "bucket" that is used to move this audio data is called the "chunk size." Each time a bucket of data needs to be moved, a CPU Interrupt is raised. An interrupt is a "call for attention" to the CPU. The more interrupts being generated by a system, the more load that is being generated on that CPU. By enabling different size buckets, up to 10 times the default bucket size, the interrupt load can be reduced by a factor of 10. Instead of 1,000 interrupts per second, Sangoma systems typically trigger 100 interrupts per second. This reduces CPU load and gives other applications a 'smoother ride'.

#4 Hardware-based Echo Cancellation

Sangoma was first to offer hardware based echo-cancellation.

Sangoma was the first to introduce hardware based echo-cancellation. By offloading this CPU-intensive task to hardware designed for this task, call quality increases and call density per server expands.

#5 Sangoma Driver DMA ZERO Copy

Direct Memory Access (DMA) is method that enables input and output to and from the main memory of a system without assistance from the CPU. Sangoma hardware uses DMA to directly transfer timeslot data to and from DAHDI buffers. This zero copy driver design saves more CPU power to handle other calls.

The Sangoma DMA chain also provides a buffer to absorb the unavoidable delays in processing, of up to 10 ms, introduced by Linux. This buffering prevents data loss and associated audio quality problems.

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#6 No Interrupt Issues. Put as Many Boards as Needed in a Single Server

Sangoma engineers have been thinking about scalability since day one. Sangoma boards have always been designed to properly share interrupts so that there is never a conflict. There can be as many Sangoma boards as necessary to support the required density or functionality in a single server, without interrupt issues.

By combining adjustable chunk size, DMA transfers, hardware echo cancellation, and an efficient interrupt system, Sangoma hardware greatly reduces CPU load and increases the capacity of the server to handle high-quality calls. By absorbing processing latency, call quality is preserved. This makes a high- density Asterisk-based system possible. It also allows CPU-intensive applications to coexist with Asterisk powered systems.

An upgrade can ALWAYS be
RESTORED
to the board in the field

#7 Unbreakable Firmware

Keeping hardware in the field up-to-date can be a major challenge for systems providers. One key task in this process is updating the firmware on the telephony boards installed in a system.

However, updating firmware in the field can be risky. If problems occur during the upgrade process, such as a corrupted firmware update file, or interrupted power during the upgrade process, the board can become damaged (sometimes called "bricked") in such a way that it usually has to be returned to the manufacturer for repair.

Not so with Sangoma boards. Unbreakable Firmware means an upgrade can always be restored to the board in the field, even if the upgrade was unsuccessful.

Every Sangoma board carries a copy of its "factory default firmware" in a protected space. In the event that disaster strikes and the active copy of the firmware becomes corrupt, the board can be flash- reloaded to the default firmware and instantly be ready to be put back into service.

#8 Higher Density Hardware

In June of 2012, Sangoma released the A116 sixteen-span board for a single PCIe slot. Sangoma's eight- span digital board was on the market for three years before our competitors finally decided to build one.

#9 More Network Interfaces

In January of 2012 Sangoma released the W400 to provide GSM connectivity for Asterisk based IP-PBXs. This expands our portfolio of over a dozen telecom interface boards to suit every application.

#10 Enhanced Statistics and Logging

The Wanpipemon debugging utility that is provided with Wanpipe drivers provides a low-level view of T1/E1 alarms and analog voltage levels. It can also provide detailed performance statistics for each interrupt type and driver path. Developers can extract a complete picture of what the driver is doing at all times, gaining deep insight into the driver and hardware level of the system. Examples of available statistics: count interrupts per second: count DMA, timer, TDM, Watchdog, BottomHalf, Rx/Tx paths per second.

If quality issues on a specific span are problematic, an individual span can be disabled on the fly, without reconfiguring Asterisk. The full diagnostic package can be brought to bear on the channel, including displaying all alarms, analogue voltage levels, setting up various loop-back modes, etc. Network and clock issues can be isolated and resolved. Once the issue has been resolved, the span can be put back into service.

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#11 Wireshark Tracking

Sangoma drivers and tools deliver the power to seamlessly capture TDM signaling channels into Wireshark-compatible format. Sangoma was first to introduce this feature. Wireshark is the de facto standard network capture tool for IP and VoIP networks, allowing IT administrators to debug signaling and network issues.

#12 Auto-Configuration in the Top Asterisk Distribution

Sangoma is all about making it faster and easier to install and provision our products. We have worked very closely with the sponsors of many of the world's top Asterisk distributions. We have funded development, provided engineering support and all the hardware needed to make sure that when a Sangoma product is detected during the installation of one of these distributions, it installs properly every time. Examples are FreePBX and Elastix.

#13 MFC/R2 Library

This 1950's-era signaling system is still widely used in digital format. Sangoma founded the OpenR2 project, sponsored it, and is the primary contributor to it. MFC/R2 is available to all Asterisk users.

Sangoma founded the

OpenR2 project

#14 The Best Warranty in the Industry

We rigorously test all boards to ensure that every board meets our demanding standards. This commitment is backed by our lifetime warranty for replacement and repair from the date of purchase on all of Sangoma's "A" series hardware. As long as the buyer has registered the board online and can show proof-of-purchase from an Empowered by Sangoma partner, that board will be repaired, replaced or returned for credit.

For more details and conditions on this one-of-a-kind warranty, please visit our website at:
www.sangoma.com/support/warranty_and_return_policy.

Conclusion

Sangoma is a market leader in the open source telephony community, and has been a pioneer and innovator for decades in this space. Asterisk is a great product that unleashes the talent and creativity of developers around the world. Sangoma is proud of our contributions to making Asterisk even better, by constantly improving the scalability, reliability and functionality of Asterisk-based systems. Many of the largest capacity, highest reliability, feature-rich, Asterisk-based systems are enabled by Sangoma hardware and software. We hope you have found this whitepaper, and the 14 ways that Sangoma makes Asterisk Better, to be useful and informative.

You and your customers demand the most of Asterisk for mission-critical solutions. You should be buying your Asterisk hardware from the company that is committed to making Asterisk better with the best hardware, software and support available in the industry.

To find out more about how we can help you make your Asterisk based system even better, please contact Sangoma or our global network of partners. You can reach us in any of the following ways:

» By phone: +1 905 474 1990 x2
» By email: sales@sangoma.com
» On the web: www.sangoma.com

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