

Diva[®] Server and Asterisk[™]

More and more traditional PBX Systems are being replaced with so-called soft PBX or IP PBX systems. Most of them support VoIP natively but allow the connection to TDM lines as well. In this way the PBX also serves as a VoIP Gateway, which can be used where internal or external lines are TDM based (BRI, PRI, E1, T1), or analog phone lines, or IP links providing the phone calls via VoIP (RTP and SIP).

Whilst Asterisk-based IP-PBXs can be used with simple telephony adapters (that is, just line connectors) which have no DSP or CPU power on the board, the problem here is that all traffic will hit the main CPU of the PC. With the CPUs of PCs becoming more and more powerful this can work reasonably well for small systems. But as each call is handled as a separate thread, the main CPU load mounts up and performance quickly becomes unpredictable. Possibly the biggest problem that Asterisk[™] integrators face is how to size the system for a given number of calls or users. This is largely because the main CPU has to do everything from streaming audio to SIP signaling and even low-level tasks like DTMF recognition.

Why using Diva Server cards in an Asterisk[™] PBX is the perfect solution



Why Diva Server?

Diva Server's DSP Hardware offloads the main CPU

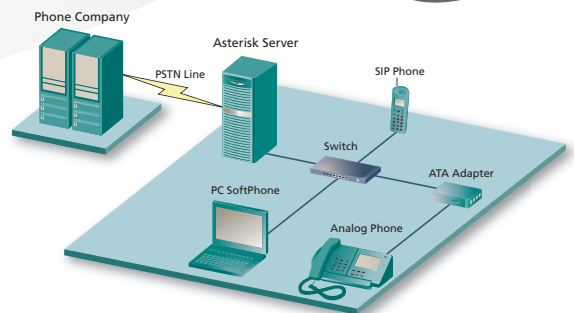
- The Diva Server card recognizes DTMF, MF and PULSE using the DSP without loading the central CPU. Asterisk[™] would normally do this low-level work using the main CPU.
- The Diva Server card recognizes and generates Fax, Modem, Busy, Dialling tones and miscellaneous Intrusion Tones according to the national protocol standard. The detection algorithms run on the DSPs of the Diva Server card without loading the central CPU.
- If required, the Diva Server card can remove the DTMF tones from the voice stream or leave it there for further processing. This feature is called DTMF clamping.
- The Diva Server card has a Part.168 Audio Signal Limiter. In many countries law requires such a volume limiter. Obviously in a voice conference a loud signal should not disturb all the other participants. The real-world performance of the Diva Server voice signal limiter is very high as it is implemented on the DSP and not in the CPU of the PC.

Superior Echo Cancellation

- The Diva Server card supports a high quality G.168 Echo canceller (ECR). The tail length is 128ms. This ECR is implemented on the DSP and does not consume any resources of the CPU.
- Echo Cancellation is critical to the real-world performance of ASR and IVR systems.
- Echo Cancellation is also essential for high quality conversations.
- ECR is important for conferencing, where echo can be completely unacceptable.

Threads

- In Asterisk[™] each voice channel uses a separate thread. Therefore, when dealing with many concurrent calls, the number of threads that have to be managed by the CPU and operating system is very high.
- Diva Server's architecture and rich tools allow multi-threaded applications easily to overcome this limitation.



Conferencing

- Diva Server cards will offer high quality conferencing with up to 60 channels, without CPU load. Conferencing is handled completely on the card and can span several Diva Server cards using cross-board conferencing without loading the central CPU, using DMA on the PCI bus. This brings no load to the host CPU. Cross-Board Conference and cross-board switching runs between all types of Diva Server adapters, i.e. analog, E1/T1, BRI, 4BRI, etc.
- As long as all the members of a conference are connected via a Diva Server card, the processing of all voice channels will be done on the DSP hardware. Therefore all interconnected lines are top quality. This also applies to fax and modem connections that are being forwarded via a Diva Server card.
- Diva Server also offers Active Speaker Recognition and Automatic Gain Control (AGC) in conference applications.

Recording of Voice Streams

- When recording voice streams Automatic Gain Control (AGC) can be switched on. This will make sure that all recordings have the same volume level.

Support of VoIP devices (RTP)

- The DSPs of the Diva Server cards are able to generate the RTP streams on the card. This offloads the main CPU from time-consuming calculations.
- The generation of the RTP stream on the DSP of the Diva Server cards allows an Asterisk™ server to drive a great number of VoIP devices like SIP phones without requiring an expensive multi CPU system.

Signaling

- Each Diva Server card can run its own signaling protocol (QSIG, 5ESS and many others). The Diva Server software (CAPI, SDK) does the abstraction. This means that Asterisk™ will be independent from the flavour of protocols what are used. Even a mix of signaling protocols in one Asterisk™ server can easily be implemented.
- Diva Server supports QSIG, Path Replacement Invite, Path Replacement Forward, Path Replacement, Two B-Channel call transfer, Single Step Call Transfer, Blind Call Transfer, Calling/Called Names.
- Diva Server supports the SS7 Signaling Protocols used by the Carriers. This allows an Asterisk™ based PBX to connect directly to the Carrier Network.

Physical Telephone Interfaces

The CAPI drivers allow using any mix of Diva Server adapters. A combination of up to 8 cards, if they do not exceed 480 channels, of the following Diva Server cards can be installed in one Server and used with Asterisk™:

- *Diva Server Analog 4P, Diva Server V-Analog 4P*
- *Diva Server Analog 8P, Diva Server V-Analog 8P*
- *Diva Server BRI-2, Diva Server V-BRI-2*
- *Diva Server 4BRI-8, Diva Server V-4BRI-8*
- *Diva Server PRI/E1/T1-CTI**
- *Diva Server PRI/E1/T1-8*
- *Diva Server PRI/T1-24 (US Version), Diva Server V-PRI/T1-24 (US Version)*
- *Diva Server PRI/E1-30, Diva Server V-PRI/E1-30*
- *Diva Server V-2PRI/T1-48 (US Version), Diva Server V-4PRI/T1-96 (US Version)*
- *Diva Server V-2PRI/E1-60, Diva Server V-4PRI/E1-120*

(*): The Diva Server CTI range does not offload CPU load onto its DSPs. It does however share the other advantages of the Diva Server range listed above. For more detailed information on the Diva Server product range and specific functionality please see the product overview at http://www.eicon.com/worldwide/products/MediaGateways/diva_server_overview.htm

Hunt Group Operation mode

The Diva Server has rich Hunt Group Mode support which is transparent to the application.

Compatibility

Diva Server is a globally deployed field-hardened range which has been extensively tested with all leading PBXs. Key compatibility features are:

- Automatic detection of the QSIG dialect (ISO, ECMA, vendor specific extensions etc)
- Emulation of Supplementary Services, even when calls are connected to different adapters. This is automatically handled via call tromboning (Line Interconnect) and/or Cross Board Switching. This is transparent for the application (Asterisk™).
- Explicit Call Transfer (ECT) Emulation is independent from the connections to different Networks. E.g. calls to QSIG and 5ESS lines can be handled even if the users are on different lines.
- ECT Emulation in QSIG network uses completion path replacement and completion notification to release local resources.

- Support of different "message waiting" procedures.
- Network or vendor specific supplementary services are made available to the application.
- World-wide certification.

Software Updates

The Diva Server software for Linux is updated on a regular basis with updates freely available at <http://www.eicon.com/worldwide/products/MediaGateways/DivaServerforLinux.htm>

Rich Additional Functionality

In an Asterisk™ Server the Diva Server adapters will provide voice functionality to the Asterisk™ server. Diva Server multi-purpose adapters also offer additional functionality to the Asterisk™ Server as well as to other applications that run on the same Linux PC. These additional features can be RAS servers, Fax Servers, POS Servers and many other services related to phone lines.

Supported Linux distributions

- Red Hat 9.0 with kernel 2.4.20-8 (uniprocessor - i368,PI,AMD-K6,Crusoe)
- Red Hat 9.0 with kernel 2.4.20-8 (uniprocessor - Athlon)
- Red Hat 9.0 with kernel 2.4.20-8 (multiprocessor - Athlon - SMP)
- Red Hat 9.0 with kernel 2.4.20-8 (uniprocessor)
- Red Hat 9.0 with kernel 2.4.20-8 (multiprocessor - SMP)
- Red Hat Enterprise Linux 3 with kernel 2.4.21-4.EL (uniprocessor - Athlon)
- Red Hat Enterprise Linux 3 with kernel 2.4.21-4.ELsmp (multiprocessor - Athlon - SMP)
- Red Hat Enterprise Linux 3 with kernel 2.4.21-4.EL (uniprocessor)
- Red Hat Enterprise Linux 3 with kernel 2.4.21-4.ELsmp (multiprocessor - SMP)
- Red Hat Advanced Server 2.1 with kernel 2.4.9-e.3 (uniprocessor - Athlon)
- Red Hat Advanced Server 2.1 with kernel 2.4.9-e.3smp (multiprocessor - Athlon - SMP)
- Red Hat Advanced Server 2.1 with kernel 2.4.9-e.3 (uniprocessor)
- Red Hat Advanced Server 2.1 with kernel 2.4.9-e.3smp (multiprocessor - SMP)
- Red Hat Enterprise Linux 4 with kernel 2.6.9-5.EL (uniprocessor)
- Red Hat Enterprise Linux 4 with kernel 2.6.9-5.ELsmp (multiprocessor - SMP)
- SuSE 9.0 with kernel 2.4.21 (multiprocessor - SMP 4G)
- SuSE 9.0 with kernel 2.4.21 (multiprocessor - SMP 64G)
- SuSE 9.0 with kernel 2.4.21-99 (uniprocessor)
- SuSE 9.3 with kernel 2.6.11-4 (uniprocessor)
- SuSE 9.3 with SMP support with kernel 2.6.11-4
- SuSE 10.0 with kernel 2.6.13-15 (uniprocessor)
- SuSE 10.0 with SMP support with kernel 2.6.13-15 (multiprocessor - SMP)
- SuSE 9.1 with kernel 2.6.4-52 (uniprocessor)
- SuSE 9.1 with SMP support with kernel 2.6.4-52 (multiprocessor - SMP)
- SuSE Linux Enterprise Server (SLES) 9 with kernel 2.6.5-7.97 (uniprocessor)
- SuSE Linux Enterprise Server (SLES) 9 with kernel 2.6.5-7.97 (multiprocessor - SMP)
- SuSE 9.2 with kernel 2.6.8-24 (uniprocessor)
- SuSE 9.2 with kernel 2.6.8-24 (multiprocessor - SMP)

Source downloads are available in RPM and DEB (Debian) format.

For more info on Diva Server for Linux software and software downloads visit <http://www.eicon.com/worldwide/products/MediaGateways/DivaServerforLinux.htm>

Solely for distribution outside of the United States.

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