Prosody X 1U

19-inch rack-mount chassis

Introduction

Aculab's Prosody X product range provides feature rich, DSP-based media processing, call control signalling, and connection to the PSTN and IP networks.

To ensure maximum 'fit for purpose' deployment flexibility and cost-effectiveness, a wide choice of Prosody X hardware variants, offering different media processing capacities, numbers of E1/T1 trunks, and a selection of industry standard form factors, is available. This family of enabling technology products includes a number of 1U, 19-inch rack-mount chassis options.

Prosody X 1U

19-inch rack-mount chassis

Prosody X in its 1U chassis is remotely controlled from an application server using Aculab's remote APIs – the same APIs that are used for board-based designs. The configuration presents a distributed, service-oriented architecture that offers both resilience and ready scalability. An added benefit of deploying Prosody X in a separate chassis is that it enables more cost-effective provisioning of your application platform, together with software virtualisation.

Additionally, load balancing and automatic failover mechanisms can be implemented to render a solution fault tolerant – from the low-level media processing up to your application or service layer.

This in-chassis implementation of Prosody X leverages Aculab's core expertise in combining telephony media processing technologies into a powerful and flexible proposition. The Prosody X hardware portfolio presents renowned, reliable, deployment proven technology that offers a comprehensive set of functionality, which can be used to create a wide range of telephony-based applications for enterprises and service providers. Typical applications include IVR, conferencing, diallers, prepaid platforms, self-service voice portals, unified communications, fax broadcast, VoIP gateways and telephony media servers.

Benefits of a chassis architecture

- Facilitates complete virtualisation of your software, leading to reduced costs
- Offers a plug in device for easy field replacement
- Removes the need for expensive servers to run boards
- Provides new possibilities for fault tolerance
- Enables procurement of lower cost application servers
- Reduces dependence on chassis vendors

Media processing benefits in a blue box

With Prosody X in a 1U chassis, form factor is rendered irrelevant as developers no longer need to worry about sourcing hard to find server configurations. Those reasonably priced PCs and telecommunications servers with enough 'right size' slots for PCI, PCI-X or PCIe cards are increasingly difficult to procure. What is of even more concern to developers is being able to productise an application in a chassis that can be consistently and cost-effectively reproduced. Aculab's 1U chassis is a straightforward 'plug & configure' addition to your equipment consignment list.

Prosody X 1U

19-inch rack-mount chassis

Prosody X 1U chassis – comparison chart

PROSODY X	1U ENTERPRISE CHASSIS	HIGH AVAILABILITY CHASSIS
Configuration: trunks	1, 2 or 4 E1/T1 trunks	4, 8 or 16 E1/T1 trunks
Configuration: DSPs	1 or 2 DSPs	2, 4 or 8 DSPs
Maximum channel count	360 channels	1440 channels
Media and signalling support	IP and TDM	IP and TDM
1U, 19-inch rack mount chassis	210mm depth	550mm depth
Remote, distributed API	✓	✓
Single 110/240V AC PSU	✓	x
Dual redundant, hot swap 110/240V AC PSUs	x	✓
Redundant DC PSU option	x	✓
Remote management adapter	x	✓
Prosody X 'plug & configure'	✓	✓
Supports all Prosody X media processing algorithms, firmware, APIs and libraries	✓	✓
'Best in class' media processing for IVR, conferencing, dialler, and fax handling applications	✓	✓
Support for deployment proven CAS, IP, ISDN PRI and SS7 protocol stacks	✓	✓
Front access trunk and Ethernet ports	✓	✓
Facilitates virtualisation of application software	✓	✓
Enables use of low cost application server(s)	✓	✓
One fixed size form factor for all your needs	✓	✓
For hardware-based telephony solutions where E1/T1 trunks are needed	✓	✓

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Media processing functions

Aculab's Prosody X chassis range runs exactly the same comprehensive selection of DSP-based software modules and firmware algorithms as its Prosody X boards.

Essential media processing resources include IP-to-TDM conversion, record and playback with a range of audio compression formats, including HD Voice codecs, DTMF tone handling, echo cancellation, and popular data transmission protocols. Each algorithm can be used separately or in combination to develop more sophisticated solutions, making Prosody X the clear hardware choice for advanced, telephony-based application development.

In addition to the standard media processing functions as with all products in the Prosody X family, the chassis variants also support a broader set of higher-level technologies. These include transcoding between various speech codecs, n-way (both wideband and narrowband) conferencing, Group 3 and T.38 fax processing at up to V.34 speeds, call progress analysis, and live speaker (answering machine) detection.

Depending on the chassis model chosen, up to 8 DSPs are available to run the algorithms and with each DSP capable of supporting up to 170 channels in a typical scenario, totals in excess of 1200 channels per 1U chassis are achievable. With Prosody X, whether transported by IP or TDM, media is handled by the same DSPs, providing developers with a truly flexible platform.

Application programming interfaces

All Prosody functionality is accessed via the same, consistent set of APIs, which are designed to maintain backward and cross platform compatibility as far as possible in order to protect investments in application code development. An application appropriately written using Aculab's APIs can be readily ported to any of the hardware or software products in the Prosody portfolio.

Scalability

Scalability is essential for every telecom service application; to support future growth of usage capacity. The distributed physical architecture of Prosody X in its 1U chassis offers linear scalability, allowing seamless growth from tens to thousands of remotely controlled channels in a multi-node platform. Resilient solutions can be implemented and scaled cost-effectively, and the impact of adding, removing or replacing a single node is minimal.

Signalling protocols

The Prosody X chassis variants also offer the same wide choice of signalling protocols as the board options. Call or session control protocols are available for VoIP, PSTN and mobile networks. These fully integrated and configurable signalling stacks and firmwares include many varieties of MFC-R2 CAS, global support for ISDN PRI, national and international variants of ISUP SS7, TCAP, SIP V2.0 and SIGTRAN M3UA.

PSTN connectivity

Chassis variants of Prosody X are designed for use in TDM-based circuit switched networks – that is, the PSTN, connection to which will undoubtedly continue to be needed for many years to come, despite the transition to IP-based transport. Several point-of-sale options are available, each with different E1/T1 digital trunk interface capacities. See the table for more details.

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19-inch rack-mount chassis

Technical summary

		1U CHASSIS VARIANT	
TDM and VoIP functionality		**Enterprise chassis**	**High availability chassis**
Audio/voice channel capacity		Up to 340 per chassis	Up to 1360 per chassis
TDM capacity		128 switchable TDM timeslots per DSP	256 switchable TDM timeslots per DSP
Telephony protocols and approvals		We have a wide range of host independent approvals and global TDM protocol coverage – see website for further details	
Tone signalling (CAS)		Included; integral	
SS7		Integrated MTP, ISUP, SCCP, TCAP, redundant MTP3, distributed ISUP, flexible ISUP, SS7 monitoring, distributed TCAP, SIGTRAN M3UA Support for high level applications – please contact Aculab for further information	
VoIP protocols	Signalling and control	SIP 2.0, SIPS[1], SDP – see website for further details	
	Media	RTP, Secure RTP[1], RTCP, RTCP XR; with variable frame size	
Voice compression[4] & 10		G.711 Annex I & II, G.723.1A, G.726, G.728, G.729A, G.729AB, G.729D, G.729E, G.729i, OKI and IMA ADPCM, GSM-FR, GSM-EFR, MS-GSM, AMR-NB, EVRC, iLBC, Speex, TETRA, iSAC[3], MELPe[3], G.722, G.722.1, licensed from Polycom, G.722.2/AMR-WB Additional codecs supported – please contact Aculab for further information	
Data modems and interfaces		V.8, V.17, V.18, V.21, V.23, V.27ter, V.29, V.32, V.34HD, V.110, V.110 RLP or HDLC, V.150.1 (gateway)[3], Bell 103, Bell 202, configurable FSK modem	
Jitter buffer		Adaptive, with configurable upper limit	
Additional functionality		User-configurable DSCP (ToS byte); DHCP; Transparent data over RTP (IETF RFC 4040)	
Media Processing functionality		**Enterprise chassis**	**High availability chassis**
G.711 A-law and μ-law encoding conversion		Included; integral	
IP-to-TDM gateway		Independent, simultaneous voice, fax and data channels	
Conferencing		N-way matrix conferencing; narrowband and wideband modes; mixing loudest/active speakers; independent volume and gain control for each participant; personalised mix for each participant (e.g., for call centre coaching, network gaming, voice chat, etc.); active speaker detection; active speaker notification via CSRC; DTMF events suppression; HD Voice	
Predictive dialling / call progress analysis		Robust and accurate live speaker detection (e.g., differentiating between a human response and that from an answering machine); simultaneous signal categorisations on a per channel basis; DTMF, tone and call progress (ringing, busy/engaged, fax, SIT etc.) detection; speech energy detection; complete cause code functionality	
Audio recording and playback		Recording & playback to local & remote hosts; multiple file formats; fast/slow pitch invariant replay	
Audio gain control		Automatic (AGC) or programmable for each channel	
Transcoding		Any-to-any voice codec[4]; full-duplex channels; rate matching; narrowband/wideband conversion (up/down sampling)	
Fax handling		T.30 & T.38 fax termination at up to V.34 speed, pass-through, relay and gateway; fax over G.711; automatic fax detection and notification; interoperability with HylaFAX systems using open source plug-in	
Echo cancellation		G.168 compliant with configurable tail of 40, 72, 104, 136, 168, 200ms[4]	
DTMF handling		DTMF detection and generation; inband; pass-through; DTMF relay and user indications (RFC 2833; RFC 4733[12]); DTMF out-of-band (SIP INFO, RFC 2976)	
Stream connection		CALEA / lawful intercept support for RTP streams; packet forking, switching and media replication (fan out)	
Additional functionality		Tone generation; universal tone detection; call progress tone detection; pulse/rotary dial detection; grunt detection; voice activity detection (VAD); comfort noise generation (CNG); packet loss concealment (PLC); silence suppression; live speaker detection; voice morphing/pitch change	

Prosody X 1U

19-inch rack-mount chassis

Physical and environmental	Enterprise chassis	High availability chassis
Operating systems supported[5]	Operating system support for Linux and Windows; see http://www.aculab.com/downloads for more details	
Chassis type	1U high, 19-inch wide, rack-mount chassis[6]	1U high, 19-inch wide, rack-mount chassis[6,13]
Chassis dimensions – height, width, depth (excluding handles)[7]	45mm x 435mm x 210mm	44mm x 435mm x 550mm
Ethernet interfaces	Dual redundant 10/100 BASE-T, via RJ45 connectors	Dual redundant Gigabit Ethernet, via RJ45 connectors
TDM network line interfaces	1, 2 or 4 E1/T1 trunks	4, 8 or 16 E1/T1 trunks
TDM network terminations	E1/T1 (75R, 100R or 120R) – software selectable	
Internal CT bus interconnections	Not applicable	H.100 CT bus[8]
Rich media DSP resources	1 or 2 DSPs	2, 4 or 8 DSPs
Chassis control	Remote (from application server) via Ethernet	
Configuration	Aculab ACT and Aculab Resource API	Aculab ACT and Aculab Resource API
Remote chassis management	Aculab ACT	HPI Manager, including SNMP V2c; and Aculab ACT
Power supply	110-240 VAC (50-60Hz)	110-240 VACz); dual redundant hot swap
Power consumption	55W max, 25W typical, 2W standby	250W max, 125W typical, 2W standby
Weight (without packaging)	3 kg	10-12 kg
Operating environment[9]	Operating (ambient) temperature: 0 to +40°C; storage temperature: -20°C minimum; humidity: 20 to 80% RH non-condensing operational, 10 to 90% storage	
EMC standards	Meets mandatory international standards: European EMC Directive 2004/108/EC; FCC part 15	
Safety standards	Meets international certification schemes: UL60950-1; EC Low Voltage Directive 206/95/EC	
Regulatory	EC Directive 2002/96/EC (WEEE); EC Directive 2002/95/EC (RoHS)	
Telecoms	Host independent approvals: Europe, USA and Austrlia[10]	
Other functionality	**Enterprise chassis**	**High availability chassis**
Software licensing	SIGTRAN M3UA is licensed on a per host basis; options range from 100 to 25600 transmit messages per second	

Notes:

1. This functionality is based on 'Strong Encryption'; its availability is restricted due to export laws and regulations – contact your Account Manager for details.
2. Provided upon request – contact your Account Manager for details.
3. This is a planned release – contact your Account Manager for details.
4. Can affect channel density.
5. Application server specific (for e.g., APIs and libraries).
6. Suitable for mounting on a shelf or with fixed side rails in a standard 19in. rack or cabinet as per IEC 60297-3-105.
7. For overall dimensions, allow additional depth for front panel handles and cables at rear.
8. Only for 16 E1/T1 trunks option.
9. Preliminary values; subject to change – contact your Account Manager for latest information.
10. Contact your Account Manager for additional country specific requirements.

Prosody X 1U

19-inch rack-mount chassis

11. Aculab does not grant the right to practice the following standards: G.722.1, licensed from Polycom , G.722.2 (AMR-WB), G.726, AMR-NB, EVRC, iLBC, GSM-FR, GSM-EFR and MS-GSM. To seek the right to practice the standards please contact the appropriate intellectual property rights (IPR) holders. For IPR related to the G.722.2, AMR-NB and EVRC codecs, please contact the VoiceAge Corporation
(licensing@voiceage.com). For IPR related to the G.723.1A and G.729AB codecs, please contact Sipro Lab Telecom (www.sipro.com) or the DSP Group (www.dspg.com). For IPR related to the ITU-T G.722.1 codec, licensed from Polycom , please contact Polycom (www.polycom.com); if you or your customer is a conference service provider, you must display Polycom's Licensed Trademark in your product.
12. RFC4733 support - DTMF handling - the optional event codes defined in RFC4733 are not yet supported
13.Slide rails are available as an option at time of purchase.

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19-inch rack-mount chassis

Technical summary

Features	Feature detail		Max resources per DSP [1]	Max resources per enterprise chassis [1]	Max resources per resilience chassis [1]
MOH playback	With DTMF detection; G.711, TDM		150	300	1200
	With DTMF detection; G.711, RTP		180	360	1440
Play and record (simultaneous)	Full duplex channels; G.711, TDM		150	300	1200
	Full duplex channels; G.711, RTP		170	340	1360
Media gateway	VoIP/TDM, DTMF handling (IETF RFC 2833); 40ms echo cancellation	G.711	126	252	1008
		G.723.1A	86	172	688
		G.726	60	120	480
		G.729AB	96	192	768
		GSM-FR	126	252	1008
		GSM-EFR	48	96	384
		EVRC	32	64	256
		iLBD	32	64	256
		G.722	48	96	384
		G.722.1	48	96	384
		G.722.2 (AMR-WB)[2]	18	36	144
DTMF detection	Can be used in parallel with play or record		150	300	1200
Matrix conferencing	G.711; DTMF handling; 40ms echo cancellation		128	256	1024
Group 3 fax transmit	T.30	v.27ter; V.29; V.17	120	240	960
		V.34	40	80	320
Group 3 fax receive	T.30	V.27ter	90	180	720
		V.29	64	128	512
		V.17	35	70	280
		V.34	20	40	160
Fax over IP	T.38 termination		100	200	800
Echo cancellation	Figures are for use in parallel with record, playback and DTMF detection e.g., to enable barge-in with ASR; echo tail 40ms		128	256	1024
Live speaker detection	Identify human or answering machine speech		170	340	1360
Data communications	V.110, V.110 RLP or HDLC, configurable FSK modem		150	300	1200
Modem over IP (MoIP) gateway	V.150.1 (V.32)[3]		20	40	160
	V.150.1 (V.34)[3]		18	36	152
Analogue display services interface (ADSI)	Library using above FSK modem allows support for GR-1273-CORE		150	300	1200

Notes:

1. These are maximum channel counts provided for illustration; actual channel counts will depend upon the simultaneous combination of functions used
2. Varies according to bit rate, figure shown is worst case with bit rate set to 23.85kbit/s
3. These figures are provisional

About Aculab

Aculab provides deployment proven telephony products to the global communications market

Whether you need telephony resources on a board, on a host server processor or from a cloud-based platform, Aculab ensures that you have the choice. We are an innovative, market leading company that places product quality and support right at the top of our agenda. With over 35 years of experience in helping to drive our customers' success, our technology is used to deliver multimodal voice, data and fax solutions for use within IP, PSTN and mobile networks – with performance levels that are second to none.

For more information

To learn more about Aculab Cloud and Aculab's extensive telephony solutions visit:

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