

## Prosody X in a 1U, 19-inch rack-mount chassis

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 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 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            |
| Remote, distributed API                                                                        | ✓                      | ✓                         |
| Single 110/240V AC PSU                                                                         | ✓                      | ✗                         |
| Dual redundant, hot swap 110/240V AC PSUs                                                      | ✗                      | ✓                         |
| Redundant DC PSU option                                                                        | ✗                      | ✓                         |
| Remote management adapter                                                                      | ✗                      | ✓                         |
| 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                           | ✓                      | ✓                         |

## Prosody X – available hardware variants

The following table illustrates the range of Prosody X hardware variants available – showing board and 1U chassis options.

| Prosody X media processing platforms  |                      |                              |                       |                                |                                             |
|---------------------------------------|----------------------|------------------------------|-----------------------|--------------------------------|---------------------------------------------|
| Product variant                       | Physical type        | Media and signalling support | Maximum channel count | Digital network access         | Platform or form factor                     |
| <b>Prosody X 1U Enterprise</b>        | DSP-based 1U chassis | IP and TDM                   | 360 channels          | Up to 4 E1/T1 trunks           | 1U, 19-inch rack-mount chassis, 210mm depth |
| <b>Prosody X 1U High availability</b> | DSP-based 1U chassis | IP and TDM                   | 1440 channels         | Up to 16 E1/T1 trunks          | 1U, 19-inch rack-mount chassis, 550mm depth |
| <b>Prosody X PCIe</b>                 | DSP-based boards     | IP and TDM                   | 720 channels          | Optional, up to 8 E1/T1 trunks | PCIe                                        |

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## Prosody X in a 1U, 19-inch rack-mount chassis

### 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.

See the Prosody X datasheet (APB0254) for more details regarding Prosody media processing functionality.

## 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<br>Support for high level applications – please contact Aculab for further information                                                                                                                                        |                                      |
| VoIP protocols                                 | Signalling and control | SIP 2.0, SIPS <sup>1</sup> , SDP – see website for further details                                                                                                                                                                                                                                                                                              |                                      |
|                                                | Media                  | RTP, Secure RTP <sup>1</sup> , RTCP, RTCP XR; with variable frame size                                                                                                                                                                                                                                                                                          |                                      |
| Voice compression <sup>4 &amp; 10</sup>        |                        | 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 <sup>3</sup> , MELPe <sup>3</sup> , G.722, G.722.1, licensed from Polycom <sup>®</sup> , G.722.2/AMR-WB<br>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) <sup>3</sup> , 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 $\mu$ -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 <sup>4</sup> ; 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 <sup>4</sup>                                                                                                                                                                                                                                                                             |                                      |
| DTMF handling                                  |                        | DTMF detection and generation; inband; pass-through; DTMF relay and user indications (RFC 2833; RFC 4733 <sup>12</sup> ); 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                                                                  |                                      |

| Physical and environmental                                                 | Enterprise chassis                                                                                                                                 | High availability chassis                                 |
|----------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|
| Operating systems supported <sup>5</sup>                                   | Operating system support for Linux and Windows; see <a href="http://www.aculab.com/downloads">http://www.aculab.com/downloads</a> for more details |                                                           |
| Chassis type                                                               | 1U high, 19-inch wide, rack-mount chassis <sup>6</sup>                                                                                             | 1U high, 19-inch wide, rack-mount chassis <sup>6,13</sup> |
| Chassis dimensions – height, width, depth (excluding handles) <sup>7</sup> | 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 <sup>8</sup>                                 |
| 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 VAC (50-60Hz); 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 <sup>9</sup>                                         | Operating (ambient) temperature: 5 to +35°C; storage temperature: -20 to +70°C; humidity: 20 to 0% RH non-condensing                               |                                                           |
| 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 Australia <sup>10</sup>                                                                                |                                                           |
| 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.
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](mailto:licensing@voiceage.com)). For IPR related to the G.723.1A and G.729AB codecs, please contact Sipro Lab Telecom ([www.sipro.com](http://www.sipro.com)) or the DSP Group ([www.dspg.com](http://www.dspg.com)). For IPR related to the ITU-T G.722.1 codec, licensed from Polycom®, please contact Polycom ([www.polycom.com](http://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.

## Channel counts summary – Prosody X 1U

| Features                                   | Feature detail                                                                                                             | Max resources per DSP <sup>1</sup> | Max resources per enterprise chassis <sup>1</sup> | Max resources per resilience chassis <sup>1</sup> |      |
|--------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|------------------------------------|---------------------------------------------------|---------------------------------------------------|------|
| 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  |
|                                            |                                                                                                                            | iLBC                               | 32                                                | 64                                                | 256  |
|                                            |                                                                                                                            | G.722                              | 48                                                | 96                                                | 384  |
|                                            |                                                                                                                            | G.722.1                            | 48                                                | 96                                                | 384  |
|                                            | G.722.2 (AMR-WB) <sup>2</sup>                                                                                              | 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) <sup>3</sup>                                                                                                | 20                                 | 40                                                | 160                                               |      |
|                                            | V.150.1 (V.34) <sup>3</sup>                                                                                                | 18                                 | 36                                                | 152                                               |      |
| Analogue display services interface (ADSI) | Library using above FSK modem allows support for GR-1273-CORE                                                              | 150                                | 300                                               | 1200                                              |      |

**Note:**

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

For more information, please contact your Account Manager or view our website

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