Vega 400 E1/T1 15-120 Channels Digital VoIP Gateway Application Note

VegaStream is a leading supplier of dedicated business VoIP gateways. VegaStream's Voice over IP (VoIP) gateways enable service providers and business customers to rapidly deploy and profit from lower telephony costs and improved productivity across their organization's HQ and remote offices. Established in 1998, VegaStream has offices worldwide. VegaStream investors include MTI Partners and VegaStream management.

Introduction

The Vega 400 is a scalable, field-upgradeable VoIP gateway designed to meet the needs of demanding service provider and enterprise customers.

A new class of gateway, the Vega 400 is scalable from 15 to 120 VoIP channels using field-installable expansion modules. As a result, it grows with the user, so customers can cost-effectively provision for their changing needs-there's no need to invest in a high-density carrier gateway initially, nor to stack lower-density gateways as traffic grows.

The Vega 400 delivers all the performance that businesses demand. Unlike competitors' products, it delivers maximum throughput of all supported VoIP calls without degradation of service. This means that for all supported combinations of call types and codecs, customers can always reliably carry up to 120 voice channels.

VegaStream's experience producing award-winning VoIP gateways is reflected in the Vega 400's assured interoperability with products from a large number of vendors. What's more, the Vega 400 is designed for maximum flexibility of deployment, allowing simultaneous connection to digital PBXs, the PSTN and IP networks, with each interface independently configurable. This means that installing the Vega 400 is non-disruptive and totally transparent to users.

Of course, every Vega 400 is reliably engineered in a compact chassis, and comes complete with VegaStream service and support for your peace of mind. It's the best way of attaining the benefits of VoIP, now and in the future.

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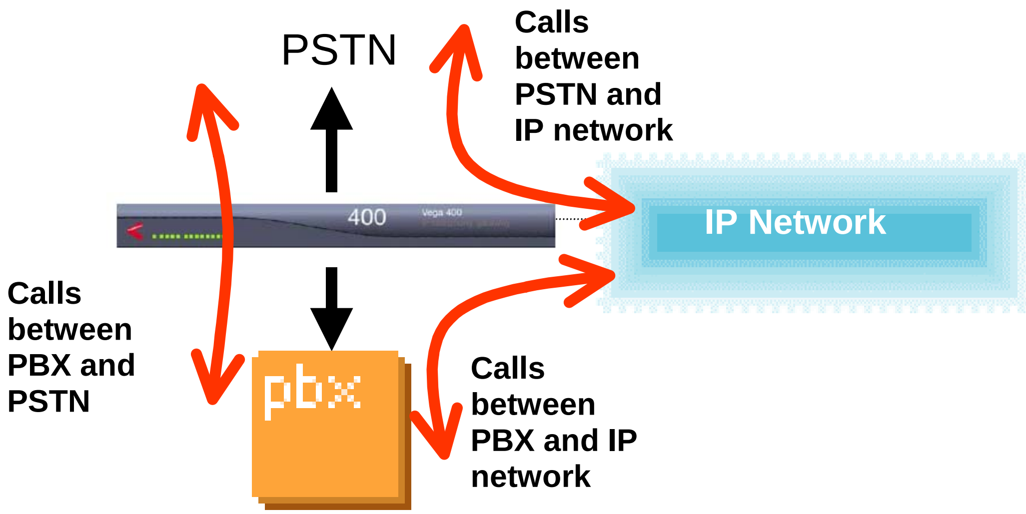
For more information on the products featured on this application note please refer www.vegastream.com

Advantages of the Vega 400

Flexible deployment



Because each of the Vega 400's four E1/T1 ports is independently configurable, it can simultaneously connect to both a PBX (NT mode) and the PSTN (TE mode), as well as the IP network. The Vega 400 has a uniquely powerful dial planner, enabling it to make call-routing decisions between each interface to minimise cost and maximise flexibility.

The gateway is ideal for both enterprise and service provider customers. In an enterprise network, the Vega 400 enables calls between sites to be routed on to an IP network directly from the customer's PBX, lowering call charges by avoiding the PSTN altogether.

With the Vega 400, an existing PBX does not need to be reprogrammed and does not need additional trunk cards. The Vega 400 can be "inserted" between the customer PBX and the PSTN and route calls to the PBX, PSTN or IP network depending on the dial planner.

In service provider deployments, the Vega 400 has two major applications as part of the service provider's voice services. The Vega 400 can be installed at a customer site and connect with the customer's PBX. Alternatively, the Vega 400 can connect to other carriers as a low-density PSTN gateway, where traffic volume does not justify a high-density carrier gateway.

Sophisticated IP network intergration

The Vega 400 supports two 100 Mbps LAN interfaces that can be configured with different IP addresses. One interface can be used for VoIP media and signaling traffic, and the other for management. Partitioning the management and voice traffic in this way facilitates the engineering of the IP network for the different performance and security requirements of VoIP traffic and management.

Groundbreaking performance

Before the Vega 400, many other low-density media gateways restricted their users from taking advantage of all the voice interfaces nominally supported by the gateway. Depending on the type of voice traffic, restrictions may have existed in a number of areas:

Internal bandwidth. The G711 codec has the highest bandwidth requirements of all commonly used voice codecs. G711 bandwidth is determined by packet size – the smaller the packet size, the greater the number of packets, and the higher the bandwidth. Other VoIP gateways may not have the internal bandwidth to support G711 at smaller packet sizes – the Vega 400 can support up to 120 VoIP calls at G711 30 msec packet size.

Digital Signaling Processing (DSP) power. The greater the compression provided by the voice codec, the greater the processing demands placed on the Digital Signaling Processing hardware and software. G723 is the most commonly used voice codec for higher compression and low bandwidth. Other voice gateways do not have DSP processing power to deliver full throughput of G723 – Vega 400 can support up to 120 VoIP calls at G723.

Core processor power. Applications with short call-hold time and high call attempts place highest demands on the core processor for call setup and clear down. Other voice gateways fail under high traffic. The Vega 400 has been tested for 120 calls using short call setup times of 30 seconds.

Unlike its competitors and predecessors, the Vega 400 can deliver its full 120 voice channels, for all supported combinations of codecs, processing requirements and call characteristics.

As well as general purpose enterprise and service provider applications, the Vega 400 is ideal for a wide range of different applications where high performance and maximum throughput are required, such as:

- Speech recognition, which typically uses G711 and may involve large volumes of inbound calls
- Low-bandwidth circuits, as found on satellites, which require full throughput of high-compression codecs
- Mobile calls, which may be of short duration

Proven interoperability

The Vega 400 is designed for maximum connectivity - in different deployment scenarios, with different technologies and for different needs, yet perhaps the most important test of connectivity is how well your gateway works with your existing technology investments.

That's why VegaStream undertakes extensive interoperability testing with leading equipment manufacturers in related fields, to make sure that your VoIP implementation goes without a hitch. Our hardware has proven interoperability with equipment from:

- Aspect
- Cirpack
- ipDialog
- Natural Convergence
- NetSapiens
- Nuera
- Sentito
- Sonus Networks
- Thomson
- Cisco
- Broadsoft
- DynamicSoft
- IVR Technologies
- NetCentrex
- Nortel Networks
- Siemens
- Snom
- Telic.net
- VocalData

Additional equipment interoperability is being added all the time. Therefore, for the most recent information, or for specific interoperability questions, please contact us.

Scalable design

One configuration cannot meet every customer's requirements. Nor will a single configuration be able to cope with changing demands. That's why the Vega 400 gives users a flexible upgrade path to enable increased capacity, new codecs and new applications as the need arises.

The base Vega 400 supports 4 E1/T1 interfaces as standard and all E1/T1 interfaces can be used regardless of VoIP capacity. The customer can choose the VoIP capacity they need and upgrade as required – calls from 1 E1/T1 interface to another E1/T1 interface do not use VoIP resources.

Upgrades to the base unit are available through field-installable expansion modules, with new capabilities unlocked by license keys. This way, you only pay for the functionality you need, and you can rapidly provision new functionality when required.

The configuration required to support different requirements depends on the specific combination of channels and codecs needed by the user. As an example, the table shows the order codes for the Vega 400 using the popular G729 codec. For other combinations of voice codecs, less than 15 VoIP channels, fractional port capacities or capacity upgrades, please contact VegaStream for information specific to your needs.

VoIP Channels	T1 Equivalents	Order Code	VoIP Channels	E1 Equivalents	Order Code
23	1	V400/T023/G729/XX	30	1	V400/E030/G729/XX
46	2	V400/T046/G729/XX	60	2	V400/E060/G729/XX
69	3	V400/T069/G729/XX	90	3	V400/E090/G729/XX
92	4	V400/T092/G729/XX	120	4	V400/E0120/G729/XX

XX = EU, UK or US depending on power lead

Expansion slots can be used to enable future new applications in addition to provisioning capacity. For example, new voice codecs and voice processing technologies can be included, as well as encryption techniques to enhance security. The slots can also be used to deliver software and configuration changes to the Vega 400 gateway.

Small Form Factor

The Vega 400 occupies 1U rack space height. Two Vega 400 gateways can be mounted back-to-back within a standard 19 inch rack, delivering 8 E1/T1 or 240 VoIP calls for just 1 U rack capacity within your facilities.

Find out more

The Vega 400 is a new breed of VoIP gateway. It delivers customers the flexibility to meet business needs: of capacity, deployment, interoperability and future evolution. Best of all, it offers all this power and control with VegaStream's proven ease-of-use and configuration, making it the obvious choice for your VoIP gateway.

Visit www.vegastream.com to find out more, or call us to discuss in detail how the Vega 400 can work for your organisation.

Technical Specifications

Interfaces

VoIP Protocols

> H.323 version 4
> SIP
> Audio codecs:
  > G.723.1 (5.3/6.4 kbps)
  > G.729a (8 kbps)
  > G.711 (a-law/μ-law) (64 kbps)

Up to 120 VoIP channels

Call Quality

> Adaptive jitter removal
> Comfort noise generation
> Silence suppression
> 802.1p/Q VLAN tagging
> Differentiated Services (DiffServ)
> Type of Service (ToS)
> QoS statistics reporting
> Echo cancellation (G.168 engineerable up to 128ms)
> NAT Traversal

Hardware

Certification

EMC (ClassB)	Safety	Telecoms (ISDN)
EN55022	EN60950	E1: TBR4
EN55024	IEC60950	T1: FCC Part 68
FCC Part 15	UL60950	T1: CS-03
AS/NZS3548	AS/NZS60950	
VCCI		

Environmental

> 0°-40°C
> 0-90% humidity (non-condensing)

Front Panel Display

LED:
> ISDN: Layer 1/2 status and NT/TE configuration
> LAN: Speed, Activity

Management

> HTTP web server – with access to user guide
> SNMP MIB 1&2
> VT100 – RS232C/Telnet

Physical Dimensions

> 437mm (17.2") x 43mm (1.7") x 275mm (10.8") width/height/depth
> Industrial rackmount: 483mm (19"), 1U
> Weight: 6.5kgs

Power

> 100-260V AC, 47-63 Hz, 1A-0.5A
> -48V DC also available, 1.2A (Max)

Program Storage

Code and configuration data are stored in FLASH and executed from RAM.

Telephony Interface

Primary Rate ISDN (User configurable NT/TE):
> 4 x E1
  Euro-ISDN
  ISO QSIG
  QSIG Feature Transparency (H.323)
> 4 x T1
  > NI1/NI2
  > AT&T 5ESS
  > DMS100
  > CAS (RBS)
    – E&M wink start
    – Loop start
    – Ground start
  > ISO QSIG
  > QSIG Feature Transparency (H.323)
> Fax Support – up to G3 fax, using T.38
> Modem Support – up to V.90, using G.711

LAN Interface

2 x 10 BaseT, 100 BaseTX, full or half duplex

Features

Identification

> Caller ID presentation
> Caller ID screening guarantees connection only from authenticated call sources
> H.323 gatekeeper registration
> SIP Registration and Digest Authentication

Billing, Operations and Maintenance

> HTTP web server – with access to user guide
> Radius Accounting
> Syslog
> Remote firmware upgrade:
  > Auto code upgrade
  > Auto configuration upgrade
> SNMP MIB 1&2
> TFTP/FTP support
> VT100 – RS232C/Telnet

Routing and Numbering

> Dial Planner – sophisticated call routing capabilities, standalone or gatekeeper/proxy integration
> Direct Dialing In (DDI)/Direct Inward Dialing (DID)