



Technology Summit
Niagara Falls, July 18, 2013

Integration at the Edge

TDM/IP and IP/IP

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Agenda

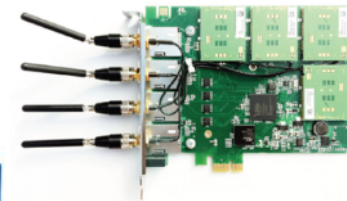
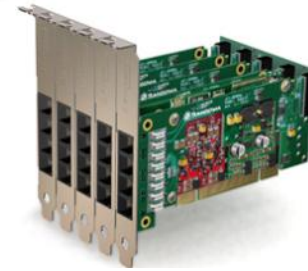
- About Sangoma
- VoIP deployment challenges
- Portfolio of Gateways
- Portfolio of Session Border Controllers
- Closing

About Sangoma

- Industry pioneer with over 25 years of experience in communications hardware and software
- Publicly traded company since 2000
 - TSXV: STC
- One of the most financially healthy companies in our industry
 - Growing, Profitable, Cash on the Balance Sheet, No Debt
- Mid-market sized firm with just under 100 staff in all global territories
 - Offices in Canada (Toronto), US (NJ), EU (UK & Holland), APAC (India), CALA (Miami)
- World Wide Customer base
 - Selling direct to Carriers and OEMs
 - Selling to the Enterprise through a network of distribution partners

Broad Line of Great Products

- Voice Telephony Boards
 - Analog/digital/hybrid, WAN, ADSL, etc
- Software Applications
 - NetBorder Express, Call Progress Analyzer...
- Gateways
 - NetBorder SIP to TDM
 - SS7 to SIP
- Wireless Products
- Session Border Controllers
- Microsoft Lync
- Fiber connectivity (STM1)
- Transcoding (boards/appliances)



Vibrant Ecosystem of Clients & Partners

Open Source Telephony

Ready to use drivers for Sangoma boards



Proprietary PBX and IVR

Plug-in to major soft-PBX and IVRs



Contact Center

OEM Integration with major software suites



Carriers, Cloud, Data Ntwks

Proven Infrastructure Technology



Innovation and Interoperability



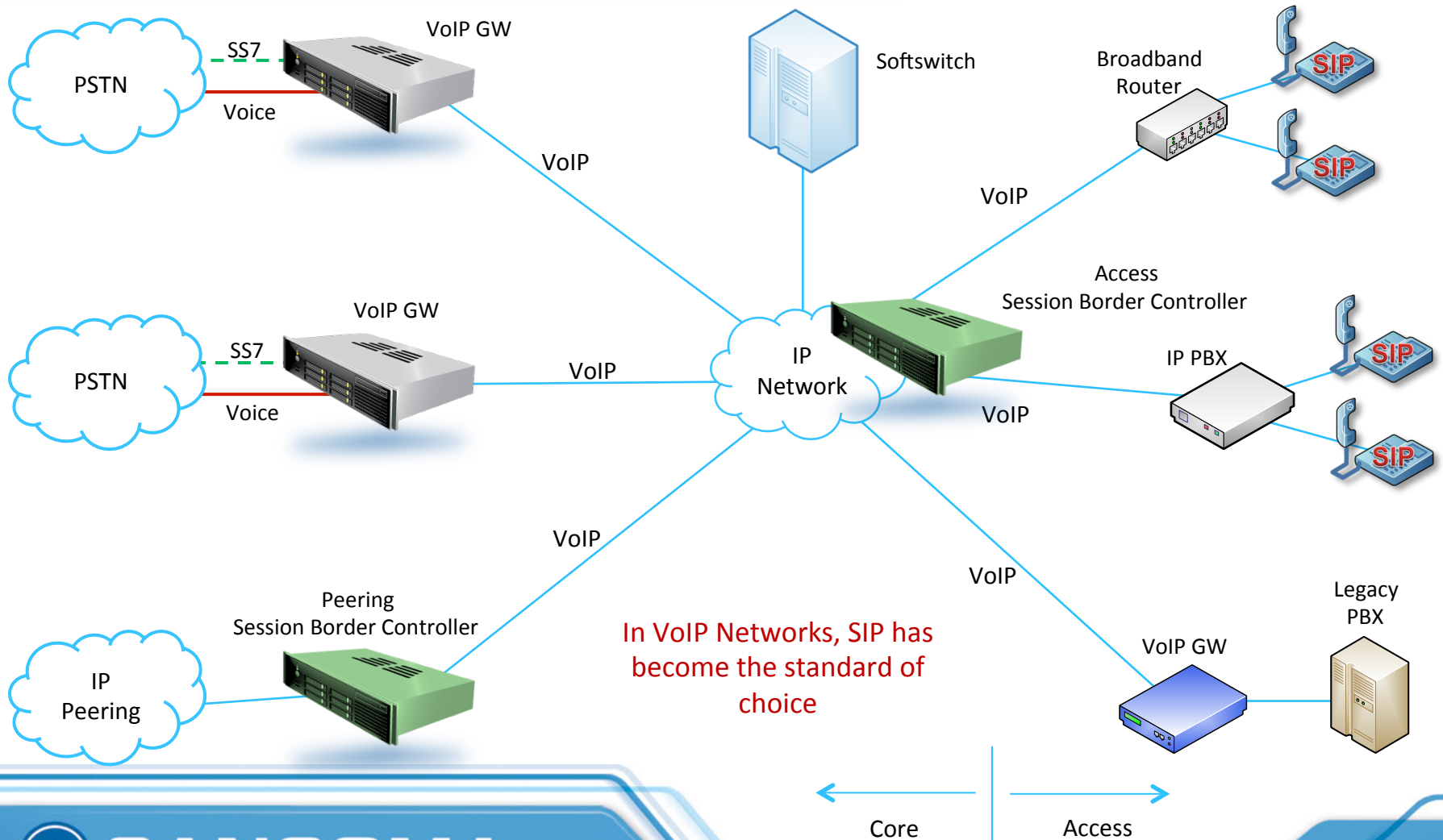
Indian Army



VoIP is now mainstream

- Yes, for sure but ...
- There are still a lot of legacy pockets/islands
- We are still in a transition phase from legacy to VoIP
- This drives the need to interconnect legacy networks with VoIP Networks
 - In the core and at customer premises
- And VoIP to VoIP Networks also brings its own set of challenges at the edge

Typical VoIP Service Provider Network



Integration at the Edge

- PSTN interconnection requires VoIP Gateways
 - SS7 to VoIP Gateway in the core
 - Enterprise VoIP Gateways for customer premises (enterprise, Soho, residential)
 - SIP Trunking into legacy PBXs
 - SIP to analog line conversion (phones or key systems)
- VoIP to VoIP brings its own challenges
 - Creates the need for Session Border Controllers
 - We will come back on this one later

Vega Series

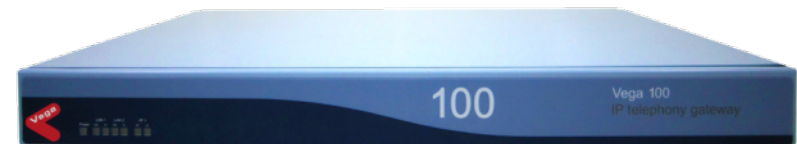
ENTERPRISE GATEWAYS



CONNECT WITH SANGOMA

Vega Series: Telecom Appliances

- Vega 50
 - H.323 / SIP
 - Up to 8 port BRI
 - Up 10 ports FXO/FXS combos
- Vega 5000
 - H.323 / SIP
 - 24 or 50 ports FXS
 - 2 FXO failover to PSTN
- Vega 100, 200, 400
 - 8 to 120 VoIP calls H.323 / SIP
 - Up to 4 T1/E1 (PRI, CAS)
 - Power fail hardware
 - Expandability and upgrades
 - DSP modules
 - Software license

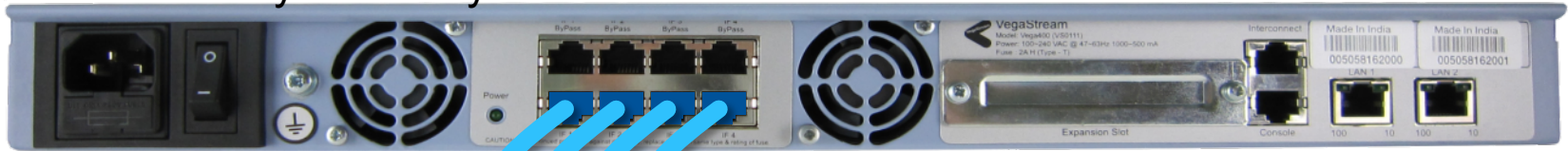


Features – All Gateways

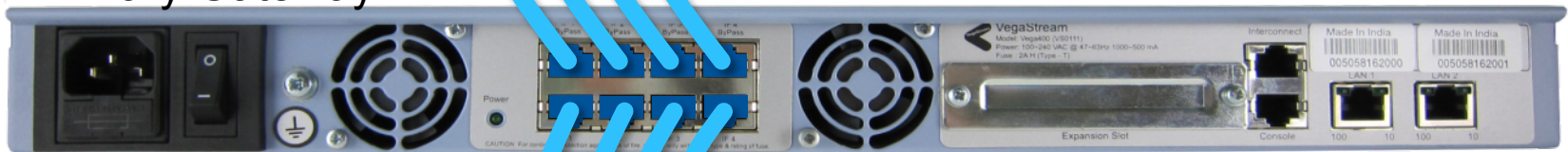
- VoIP Protocols
 - SIP or H.323
 - TLS / SRTP for security
- Dual LAN + Console Port
- Management
 - Web GUI
 - CLI
 - RADIUS
 - SNMP
 - Syslog
 - Billing logs
- Powerful call routing capabilities
- Remote Firmware Upgrade
- Vocoding
 - G.711, G.729, G.723, G.726
- G.168 Echo Cancellation
- T.38 Fax relay
- Enhanced Network Proxy for failover

Vega Provisioned for By-Pass

Hot Stand-By Gateway



Primary Gateway



E1/T1 cables

E1/T1 cables

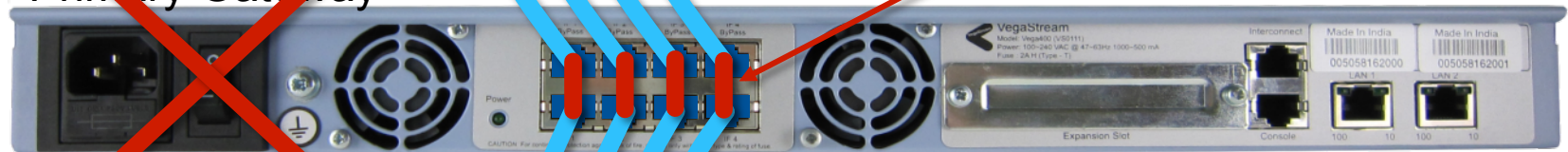
To/From
Telco

Operating in By-Pass Mode

Hot Stand-By Gateway



~~Primary Gateway~~

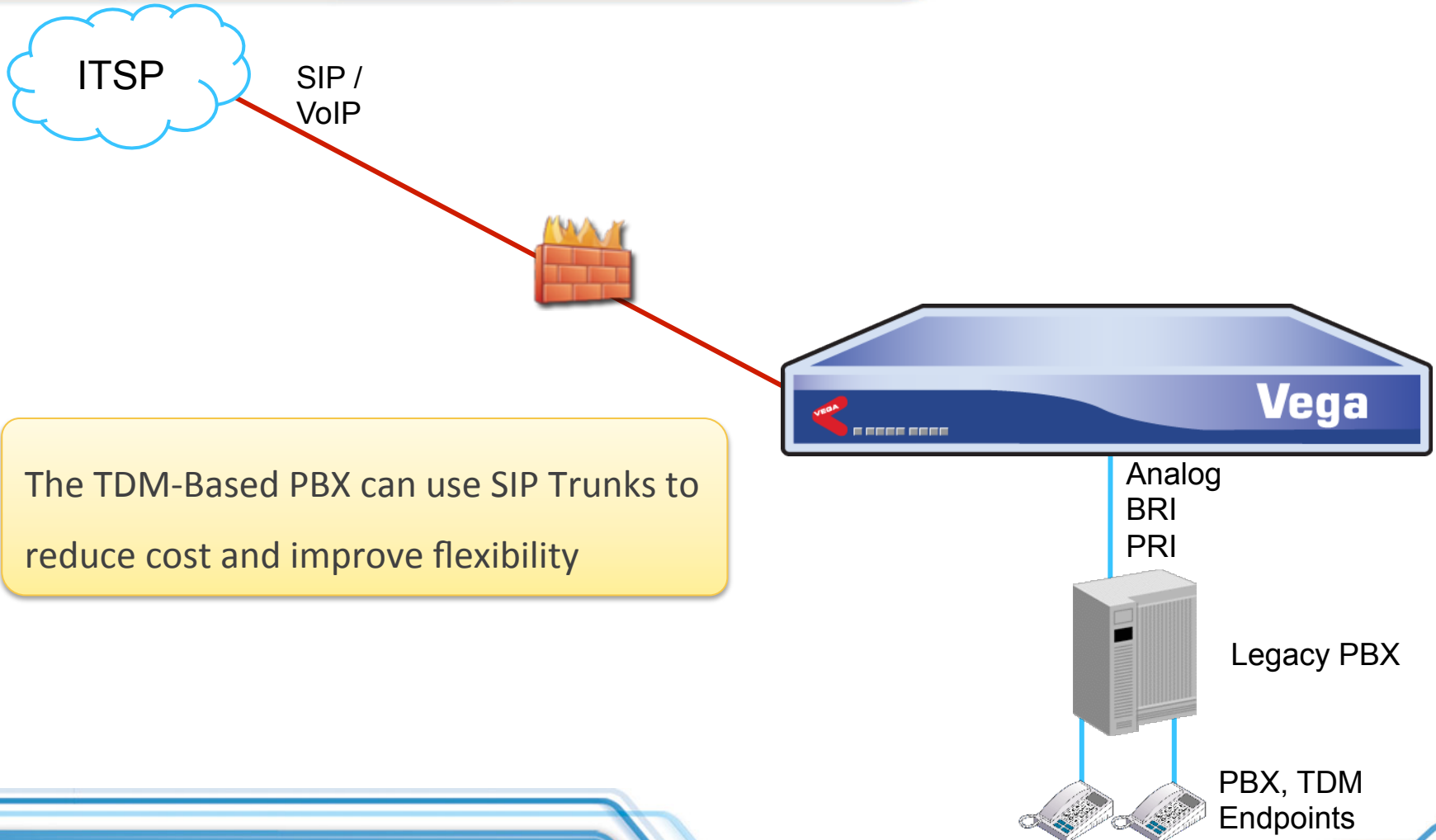


Internal relay trips to connect to by-pass ports

T1/E1 cables

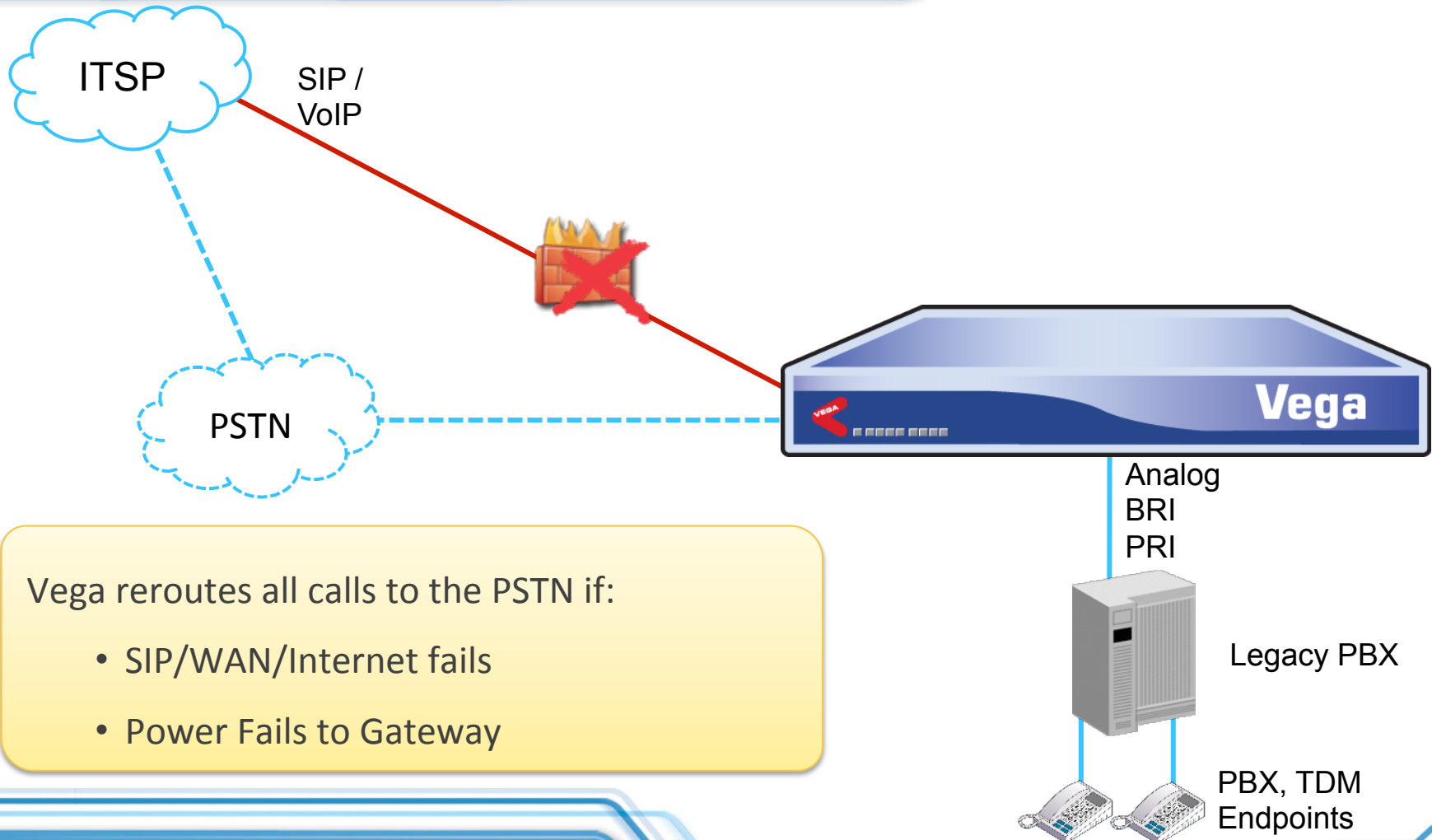
To/From Telco

SIP Trunking

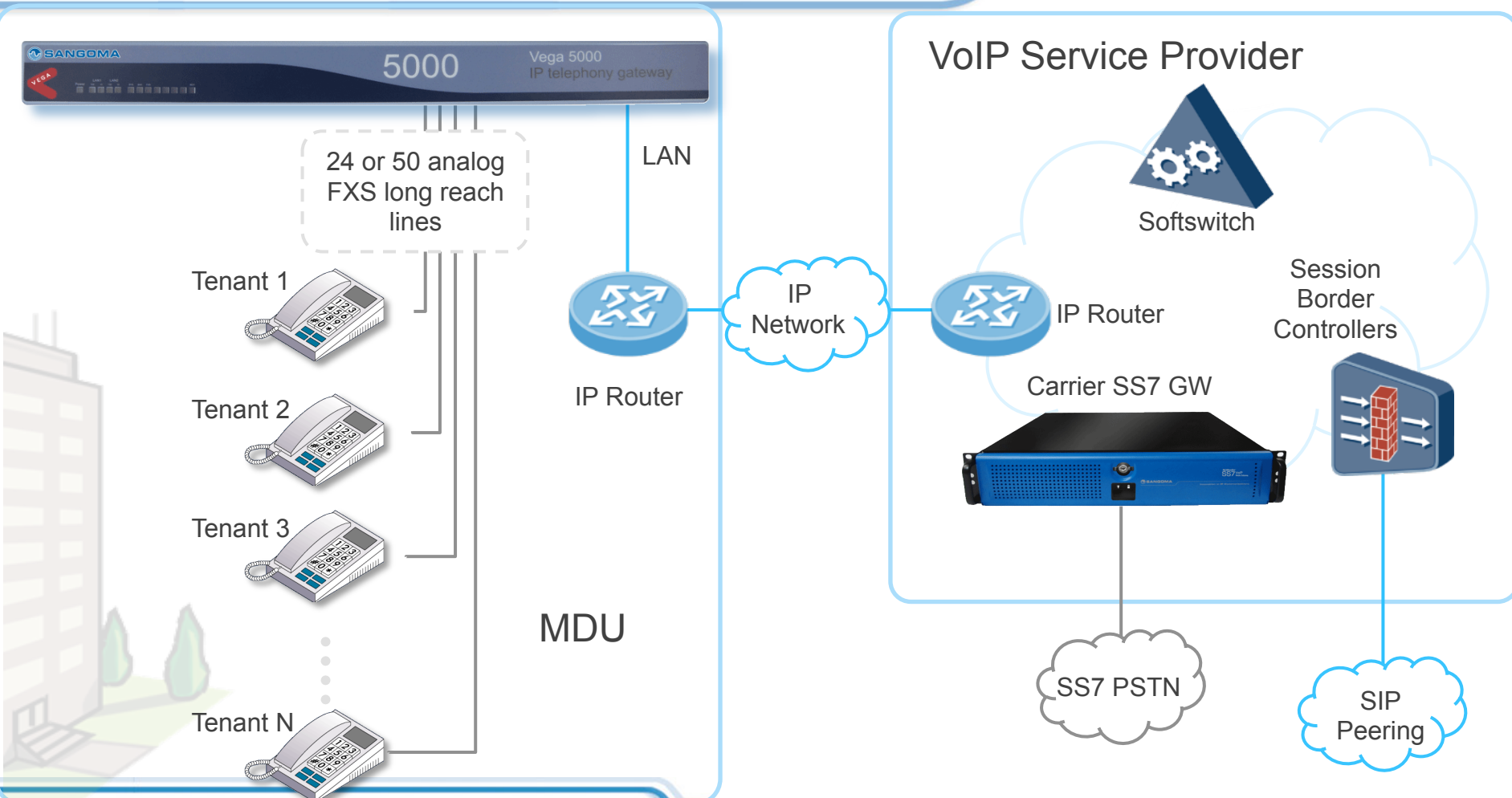


The TDM-Based PBX can use SIP Trunks to reduce cost and improve flexibility

SIP Trunking with Resilience



SIP Dial Tone/Multi-Dwelling Units



SNAP TOOL

- Sangoma Network Appliance Provisioning Tool simplifies provisioning and deployment of gateways for use on Interoperability Partners' networks
 - Sangoma builds standard configuration files for an Interoperability Partner
 - Through the Snap Tool, user provides installation specific info (IP Address, User_Name, Password, etc.)
 - Snap Tool automatically builds a provisioning template that can be instantly uploaded to the gateway
- We can work with you to add your SIP trunking service on SNAP

Step One: Select a Carrier



› 1. Select Carrier

Select a carrier

The SNAP tool enables Sangoma's Interoperable Service Providers to quickly and easily provision Sangoma Vega Gateways. This tool can be used to provision a Sangoma Vega Gateway prior to deployment (if the gateway is being provided by the Service Provider) or it can be used at the deployment site to provision the gateway just before installation.

SNAP leads the user through a series of screens to properly identify the Service Provider and the Model of the Vega Gateway to be provisioned. The user will then be prompted to provide their network credentials or other information that are to be applied to the provisioning template.

SNAP will then generate a file that, once uploaded to the gateway, will properly provision the gateway for use on the selected service provider's network.

Select the Carrier Network from the drop-down list below and then click SELECT. If your carrier of choice does not appear on this list, please contact bmorrison@sangoma.com for assistance.

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Step Two: Select Gateway



✓ 1. Select Carrier

➤ 2. Select Product

Vitelity / Product

Select Product

Click on the name of the Vega Model from the list below that is to be configured. Once a Vega is selected, a second list showing all available configurations for that model will be displayed. Click the SELECT button next to the desired configuration to proceed.

If the required Vega Model or Configuration is not on this list, please contact bmorrison@sangoma.com for assistance.



Vega100: E1/T1 Digital Gateway

The Vega 100 VoIP gateway connects digital telephony equipment to IP networks with a single E1/T1 interface.

Configuration

Description

23chan-dhcp

23 channels DHCP

Select

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Step Three: Add Specifics



Sangoma Network Appliance Provisioning Tool

- ✓ 1. Select Carrier
- ✓ 2. Select Product
- 3. Provision

Vitelity / Vega100: E1/T1 Digital Gateway / 23 channels DHCP

Fill In Form

Please fill in ALL FIELDS in the form below and then click SUBMIT.

23 channels DHCP

Public IP address	<input type="text" value="123.123.123.123"/>
SIP User Name	<input type="text" value="user@sangoma.com"/>
Password	<input type="text" value="sangoma"/>
SIP Proxy	<input type="text" value="123.123.123.123"/>

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Step Four: Download Template



Sangoma Network Appliance Provisioning Tool

- ✓ 1. Select Carrier
- ✓ 2. Select Product
- ✓ 3. Provision
- 4. Download

Vitelity / Vega100: E1/T1 Digital Gateway / 23 channels DHCP

Configuration Files

Download the configuration file below and follow instructions <http://wiki.sangoma.com/How-To-load-a-config-file-to-the-Vega-using-the-WebUI>

Parameters

Public IP address 123.123.123.123

SIP User Name user@sangoma.com

Password sangoma

SIP Proxy 123.123.123.123

File

vitelity-vega100-23chan-dhcp.txt

Download

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NetBorder Series

SS7 GATEWAYS

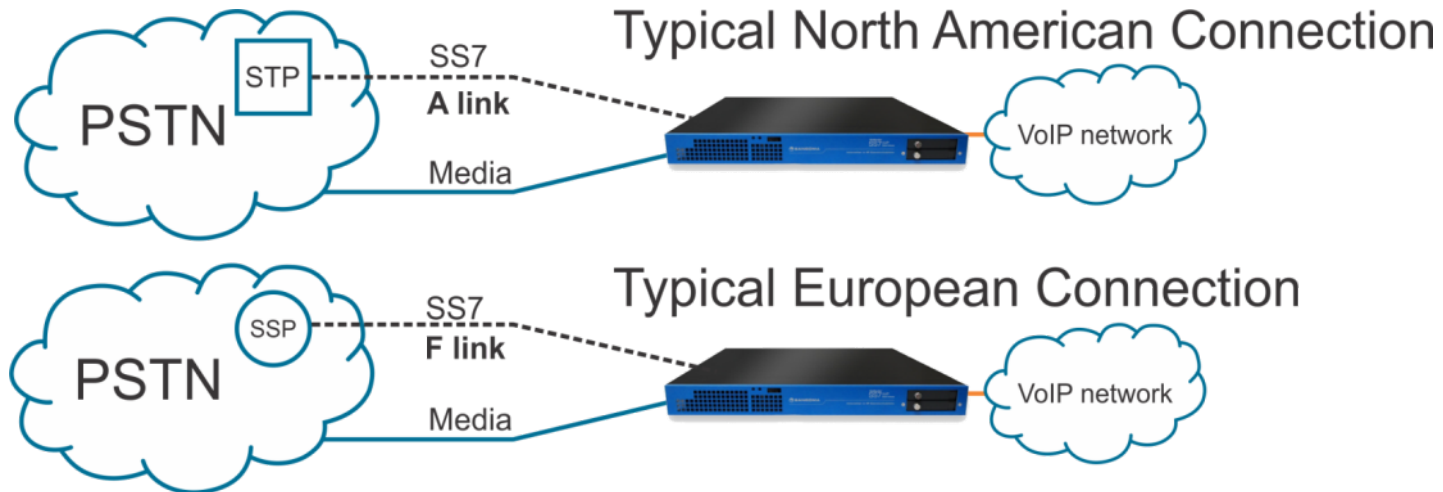
NetBorder SS7 Gateway Features

- Up to 32 T1/E1 per server
- Can scale up to 288 E1s in relay mode where multiple systems act as one
- SS7 ISUP Signaling with several national variants
 - ITU, ANSI, Bellcore, France, UK, China, India and Russia
- Wide range of narrowband and wideband codecs supported
 - for any to any codec transcoding
- Robust implementation with distribution, failover and redundancy
- Flexible XML based routing rules for call control
- Coming Features:
 - T.38 and SIP REFER support
 - Sigtran relay and termination
 - Megaco / H.248 support for enhanced Softswitch integration

Deployment Options

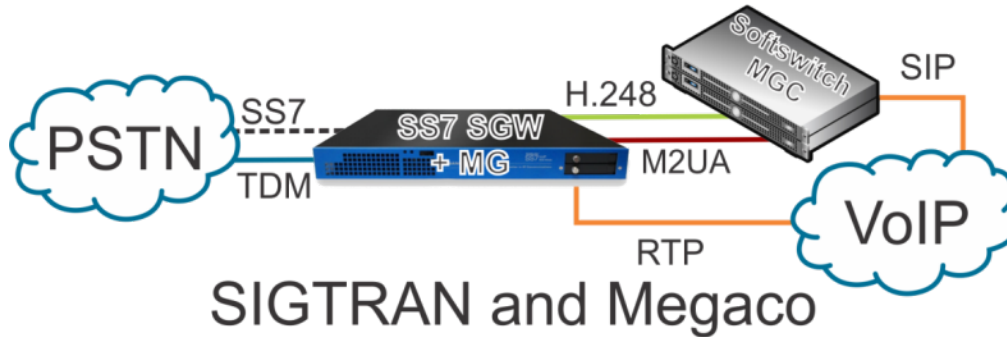
1U	4 E1/T1	
	8 E1/T1	
2U	16 E1/T1	
	32 E1/T1	

SS7 Gateway Place on Network



- SS7 signaling to gateway is like an SSP on the PSTN network
- Signaling connects directly to SSP or STP equipment
 - Connects to STP node via an A link (typical North American)
 - Connects to SSP node via an F link (typical European)
- These are not yet supported: CNAM, LIDB, LNP or anything SCCP (TCAP, MAP or INAP)

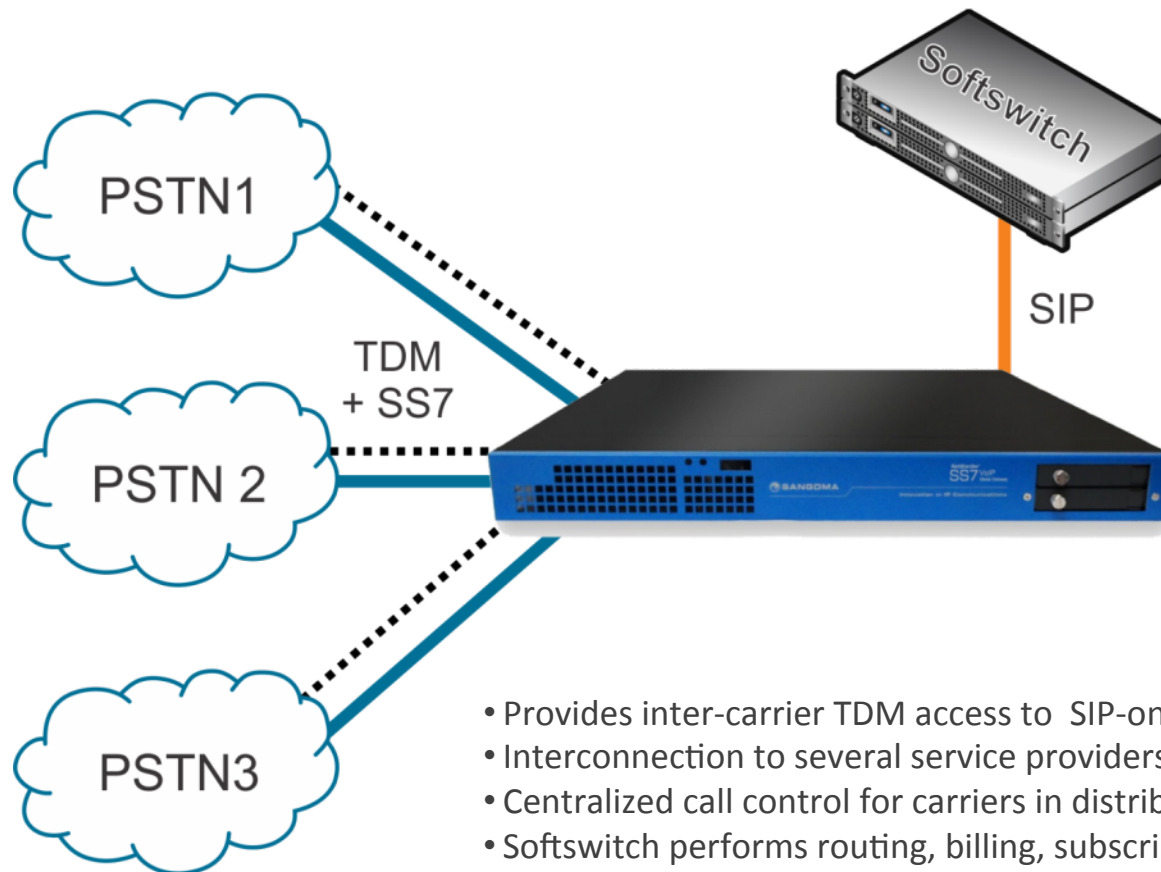
SS7 to VoIP Inter-Working



Coming Soon:



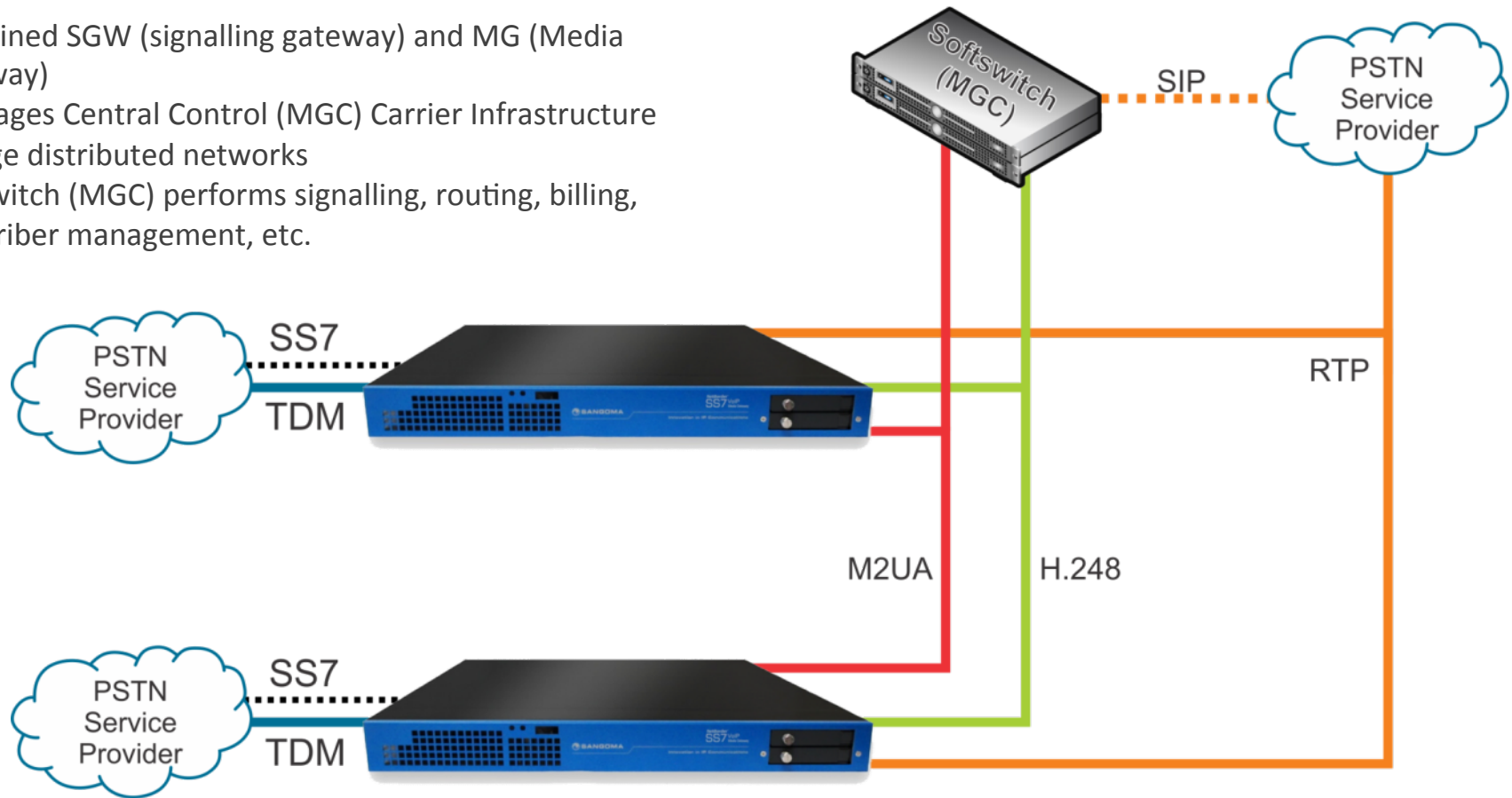
Access Gateway for SIP Softswitch



- Provides inter-carrier TDM access to SIP-only based Softswitch
- Interconnection to several service providers
- Centralized call control for carriers in distributed networks
- Softswitch performs routing, billing, subscriber management

Access Gateway for Megaco Networks

- Combined SGW (signalling gateway) and MG (Media Gateway)
- Leverages Central Control (MGC) Carrier Infrastructure in large distributed networks
- Softswitch (MGC) performs signalling, routing, billing, subscriber management, etc.



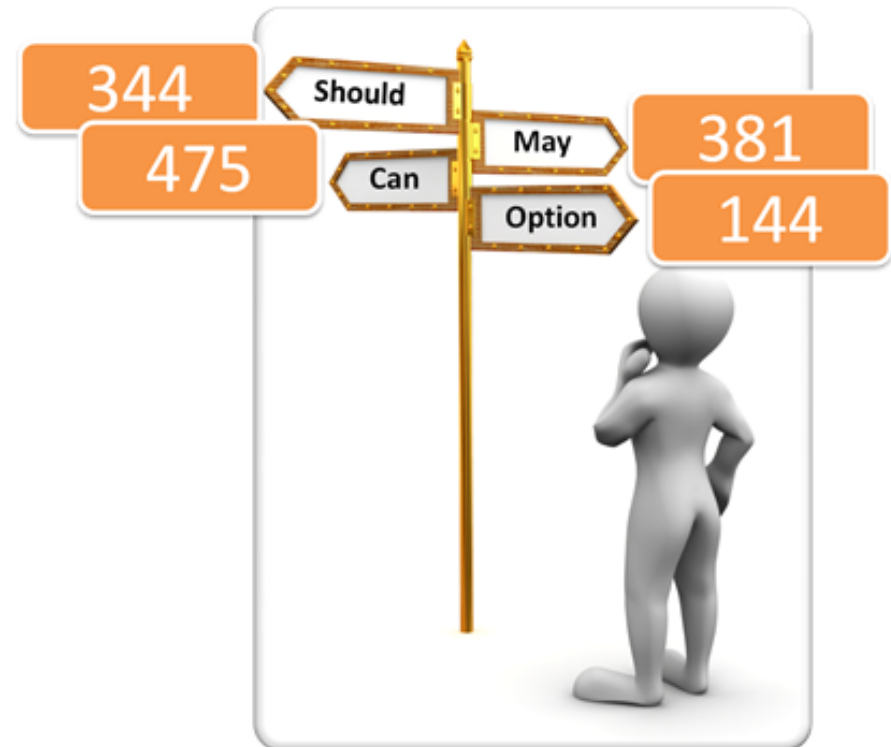
Megaco: **Media Gateway Control Protocol**
(aka H.248)

Integration at the Edge

VOIP TO VOIP INTEGRATION CHALLENGES

End to End VoIP interworking challenges

- SIP is it! RFC3261
- But while it is the largest RFC around, easy to end up with incompatible SIP end-points
- Quick search in RFC for words such as Should, Can, May, Options! It's pretty loose!



Other challenges

- Solve firewall and NAT issues (ALG) without compromising security / integrity of networks
- Normalize sip messaging
- Fix errors in the sip messaging stream
- Register sip trunks with ITSP
- Secure SIP & voice (TLS, SRTP, IPSEC)
- Codec conversion
- Manage QoS settings and SLA
- Provide access to remote users

This is what SBC's do!

Security Threats with VoIP

- Denial of Services
 - Call/registration overload
 - Malformed messages (fuzzing)
- Configuration errors
 - Mis-configured devices
 - Operator and application errors
- Theft of service / Fraud
 - Unauthorized users
 - Unauthorized media types
- BYOD
 - Smartphones running unauthorized apps
 - Viruses and Malware attacking your VoIP network
- Denial of Services
 - Call/registration overload
 - Malformed messages (fuzzing)
- Configuration errors
 - Mis-configured devices
 - Operator and application errors
- Theft of service / Fraud
 - Unauthorized users
 - Unauthorized media types

This is what SBC's do!

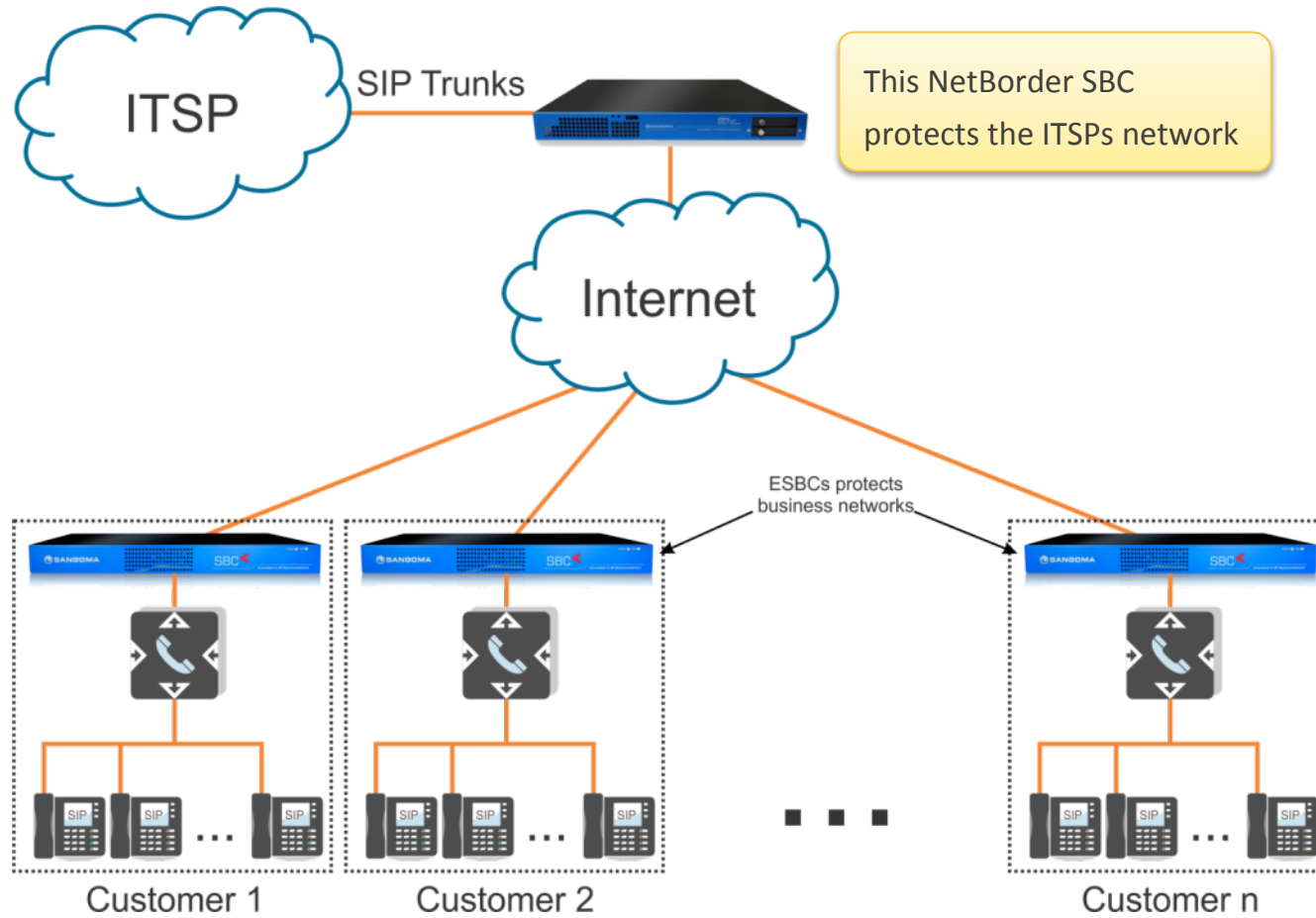
PORTFOLIO OF SESSION BORDER CONTROLLERS

Session Border Controllers

- Vega Enterprise SBC
 - 25-250 Sessions/Calls
- Vega VM Enterprise SBC
 - 25-500 Sessions/Calls
 - Software Only/Virtual Machine Ready
- Vega VM/Hybrid Enterprise SBC
 - SANGOMA EXCLUSIVE
 - 25-500 Sessions/Calls
 - SBC Maintained in VM
 - Media Functions offloaded to external hardware resource
- NetBorder Carrier SBC
 - 250-4000 Sessions/Calls

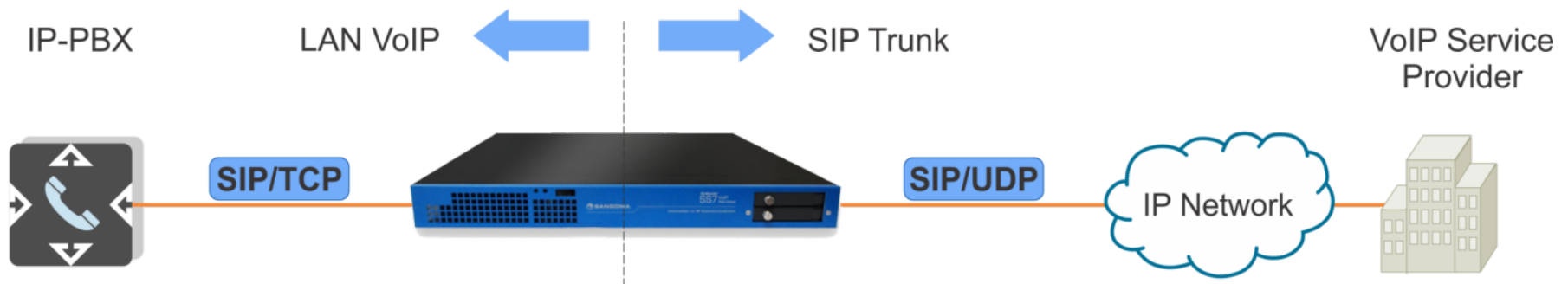


SIP Trunking



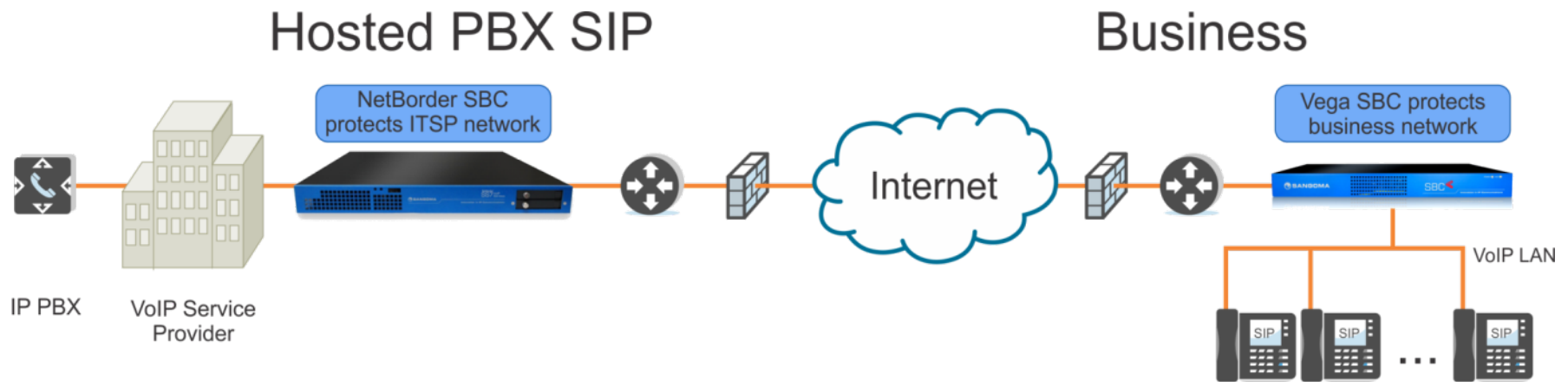
SIP Signalling Conversion

- Convert SIP over TCP to SIP over UDP
- Some devices require SIP/TCP
 - e.g. Microsoft Lync



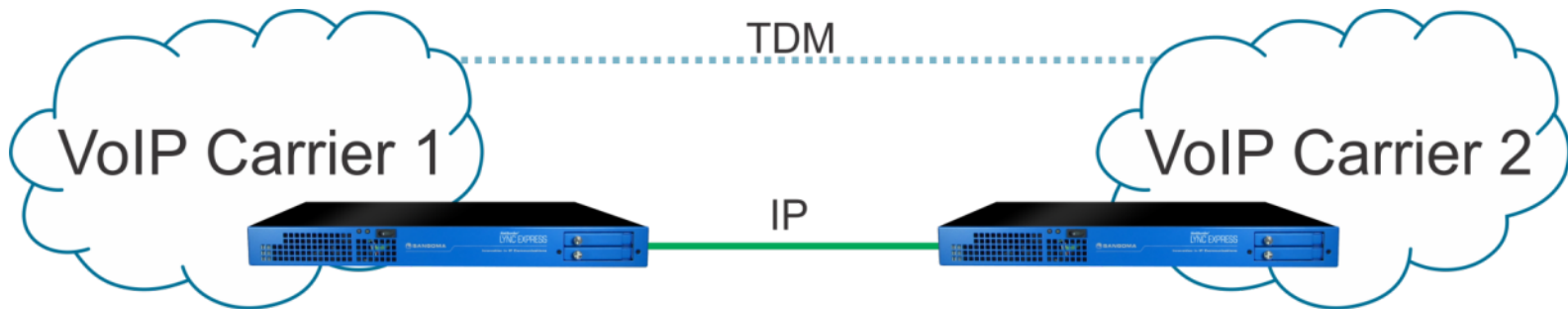
SBC For Hosted PBX

- Known demarcation point
- Reduces interoperability issues with core
- Transcoding if required



SIP Network Peering/ IP Carrier Interconnect

- Use IP for inter-carrier links
- No TDM conversion required:
 - Decrease complexity
 - Better voice quality, less delay, less transcoding



Move from VoIP islands to
all IP communication between carriers

Simple Licensing

- Simple per session licensing
 - No Per Feature, Per User or Per Codec licensing
- Predictable SBC capacity and cost in every use case

CLOSING

Closing

- Transition from Legacy to VoIP is still happening
 - Drives the need for VoIP Gateway
- End-to-end VoIP networks introduce new challenges
 - Drive the need for Session Border Controllers
- Sangoma provides a portfolio of products that suit small and large service providers

Thank You!

Questions?