Attendee Dashboard

**Control Panel**

- Click plus [+] icon to expand menus
- Click minus [-] icon to collapse menus

**Questions Panel**

- Type and submit your questions in the Questions Pane
- Located on the right hand side of your screen
Inside this Deck

• About Sangoma
• SIP Market
• SBCs Demystified
• Business Applications and Use Cases
• Portfolio of SBCs
• Sangoma Advantages
• Summary
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

- Cloud based monitoring

- Fiber connectivity (STM1)

- Transcoding (boards/appliances)
Vibrant Ecosystem of Clients & Partners

Open Source Telephony
Ready to use drivers for Sangoma boards

- Asterisk
- FreeSWITCH
- caliweaver
- elastix®
- yate
- trixbox

Contact Center
OEM Integration with major software suites

- ORACLE®
- inConcert
- GENESYS
- OreCX
- TRISYS
- ALTEOR
- e-contact

Proprietary PBX and IVR
Plug-in to major soft-PBX and IVRs

- Microsoft® Lync™
- Barracuda Networks
- snom
- AASTRA
- 3CX
- Fonality
- INTECH
- Nucleum

Carriers, Cloud, Data Ntwks
Proven Infrastructure Technology

- BT
- CISCO
- CLEARCABLE
- ERICSSON
- SIEMENS
- Nokia
- TELUS
- verizon
- MTT
- ORANGE
Innovation and Interoperability

Indian Army

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SIP TRUNKING: THE MARKET DRIVER
Defining SIP Trunking

• “The use of SIP service bundled in a familiar business construct to connect a PBX or gateway to the PSTN over the Internet”
• An alternative to T1s, PRIs, and POTS lines
• Pure SIP will allow you to make and receive calls worldwide and should include:
  – E911
  – Directory Assistance
  – CNAM (Caller ID/Name)
SIP Trunking Benefits

• SIP Trunking allows companies to replace physical PSTN trunks with virtual, broadband trunks, deployed over data connections

• Can be
  – Dedicated lines or shared connections
  – Internet connections
  – Burstable

• Introduces more flexibility, more efficiency, reduces operational costs
SIP Trunking Diagram

- SBC used to provide security between the two IP Networks
- May also handle signaling interoperability
- May also handle basic transcoding
- Connection from PBX could be digital or analog
SIP Trunking & Hosted PBX

- SIP Trunking is driving eSBC uptake
  - Replace physical PSTN trunk with IP based connection
  - Improved ROI
  - Share with data
  - More flexibility

SIP Trunking Market

- CAGR: 22%

Now $7.44 billion by 2017
eSBC Growth

• Infonetics:
  – Enterprise SBC market set to grow an average of 49% annually through 2013
  – The market for eSBC jumped 60 percent in 2011
  – Forecasts eSBC will reach $527 million globally in 2016
INTEGRATION AT THE EDGE
Integration at the Edge

• Implementing innovative, cost-effective technologies at the edge of the network

• Manage Uncertainty
  – Minimize Capital Investment
  – Leverage Existing Infrastructure
  – Mitigate Service Disruption

• Still Deliver Advanced Services by connecting disparate networks
SIP Trunking
SECURITY
Enterprise Security Threats

• 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
Different from a Firewall
Firewall Is Not Enough

• Traditional firewalls cannot
  – Prevent SIP-specific overload / SIP DoS
  – Open/Close RTP media ports in sync with SIP signaling
  – Track session state and provide uninterrupted service
  – Perform internetworking or security on encrypted sessions
  – Solve multi-vendor SIP interoperability
  – Topology Hiding

• Firewall/NAT break SIP communications (does not traverse firewalls)

• SBCs do all of the above
Why VoIP Brings More Risk

- VoIP often carried across public networks
- Calls can be placed and terminated on many devices – IP-Phones, smart phones, desktops, etc.
- Threat level more like that of any internet device
  – Would you access the internet without a firewall?
Legacy TDM Connections

- TDM based phone calls take place on approved equipment connected to private networks run by the telco.
**SBC is a B2BUA**

- SBC is a Back-to-Back User Agent
  - B2BUA terminates sessions and re-initiates a new session on the other side
  - SBC is in the path for all calls
  - SBC controls all the elements of the session

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**Legend / Lingo**
- Signalling = SIP
- Media = RTP
- Media Control = RTCP
INTEROPERABILITY
SIP Interop Challenges

• SIP (RFC3261) and Interoperability challenges
  – Largest RFC
  – Not a ‘super tight’ spec:
    • Should: 344 times
    • Can: 475 times
    • May 381 times
    • Option: 144 times
  – Lots of room for interpretation
  – SIP Endpoints end up with slight differences that make it hard to interconnect
• End point could use different codecs
Codecs

- Codecs encode and decode voice for network transmission
- **Sampling rate**: Number of samples per seconds
  - The higher rate the better the quality
- **Quantization**: Granularity of the representative data
  - The more granularity the better the quality
- **Bit rate** = [Sampling rate] X [Quantization bits]
  - The more quality is desired, the highest the bit rate will be
- **Sampling time**: How long do I collect samples before “feeding” the algorithm
  - 10 ms, 20 ms, 30 ms, etc.
- Algorithm is the core of the codec
  - Compression formulas
  - It’s is digital signal processing and a lot of math
Sample Codecs

• G.711 (PCMU/PCMA, mu-law / A-law) – Narrowband
  – Sampling rate: 8 KHz (8000 times per second)
  – Bit Rate: 64 Kbps
  – Sample Time: 10ms, 20ms, 30ms, 40ms, etc

• G.722 – Wideband
  – Sampling rate: 16 KHz (16000 times per second)
  – Bit Rate: 48kbps, 56kbps and 64kbps
  – Sample Time: 10ms, 20ms, 30ms, 40ms, etc.

• G.722.1 Annex C - Ultra-wideband
  – Sampling Rate: 32 KHz (32000 times per second)
  – Bit Rate: 48kbps
  – Sample Time: 20ms, 40ms, 60ms
Need for Transcoding Servers / Proxy

• I have a call for you
• What do you support?

1. I’m calling the phone on the other side
   • I can do G.711

2. SIP

3. G.711 Voice Call

4. OK. I will broker the call on both ends
   • I can do G.729

• SIP
Who Gets in, Who Gets out

• Policy and List Management
  – White Lists: Who always gets in or out
  – Black Lists: Who never gets in or out
  – Grey Lists: Who has restricted access

• Very important as BYOD gets more traction
Resource Restrictions

- Bandwidth Usage
  - How much
  - When
  - From Where

- By Network
- By Application
- By Person
- By Location
THE SIMPLIFIED SBC
SBC Is The Front Door To Networks

• SBC controls entry (or not) to a network
• Directs communication between end devices
  – This communication is called a session
• SBC can do this because it sits at the border between two networks

Session: Communication between two SIP devices
Border: Integration at the Network Edge
Controller: Command and Control
Sessions

- **Signalling**
  - Sets call path up, negotiates codec to be used, teardown
- **Media**
  - Transports the voice or video
- **Media Control**
  - Collect information on voice quality

**Legend / Lingo**
- Signalling = SIP
- Media = RTP
- Media Control = RTCP
Three ways that the SBC Protects the Enterprise Network

1. DoS Protection. Prevent Denial-of Service (DoS) attacks from affecting network performance
2. Topology Hiding. Hide the topology of the network. This makes it much harder for hackers to access the system
3. Encryption. Encrypt the communications, both signalling (SIP) and media (RTP)
Four ways that SBCs enable simple deployment and easy Interop

1. SIP Normalization. Different vendors have different SIP implementations. SBCs can translate between these SIP variations.

2. Transcoding. Converting between different codecs for the media stream.

3. Enable SIP Trunking. SIP trunking saves money and brings flexibility.

4. NAT Traversal. Perform dynamic port remapping for signalling and media.
Three ways that the SBC provides call access control

1. **BYOD.** Users within an enterprise now expect to be able to make calls on many different devices. Malicious apps on those devices can facilitate toll fraud.

2. **Toll Fraud Detection.** SBC manages all outbound connections so can detect changes in behaviour for internal users.

3. **Call Policies.** Manage policies that define what devices and users are allowed to make certain call types.
BUSINESS APPLICATIONS AND USE CASES
SIP Trunking

**Diagram Description:**
- **ITSP:** Internet Service Provider
- **DMZ:** Demilitarized Zone
- **Internet**
- **Corporated Network**
- **NetBorder SBC** protects ITSP network
- **Vega eSBC** protects customer network
- **PBX, TDM Endpoints**
- **Legacy PBX**
- **Analog BRI PRI**
- **VoIP Gateway**
SBC For Hosted PBX

• Advantages
  – Known demarcation point
  – Reduces interoperability issues/resource with core
  – Transcoding if required
Interworking with IP-PBX

• Advantages:
  – All advantages of SBC for SIP trunks
  – Least Cost Routing
  – Resilience
  – Load Balancing
Lync Interworking with SIP Trunks
Product Positioning

The most cost-effective, easiest to provision, and easiest to manage line of SBCs on the market
Product Highlights

• Scalability from 25-4000 Sessions/Calls
• Four Models to meet specific deployment needs
  – Available Virtual Machine Model
• A Single GUI/Provisioning Tool for all Models
  – Traffic Visualization Tools for easy analysis
• Simple Licensing Model
  – No Hidden Fees
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
Product Highlights – All SBCs

- Web GUI for ease of Configuration and Deployment
- Efficient Scaling from 25 to 4000 Sessions/Calls
  - 1 session per voice call
  - SIP Registrations do not consume sessions
- Session-based licensing, no hidden costs or fees
- Cost-Effective Carrier-Class Features and Performance
- Network Interconnect Point for SIP Trunking
- QOS & QOE (Quality of Experience) for Enterprise Networks
- Encryption and Security
- Topology Hiding for Fraud Protection
- DOS/DDSO Attack Protection
- Advanced Routing
- Hosted NAT traversal
- Voice, Video, Fax, IM and Presence Support
- SIP-SIP Interworking & protocol normalization
Vega Enterprise SBC

• Enterprise Inter-Site Networking and SIP Trunking Border Control
• Enables Local Security Management for SMBs and Small Enterprises
• Supports 25 to 250 Simultaneous Sessions
  – Field Upgradeable Session Expansion
• Hardware Based Transcoding and Media Handling
• Web GUI Configuration and Smart Defaults for Simple Deployment
Vega VM Enterprise SBC

• Supports 25 – 500 Sessions/Calls
• Virtual Machine-Ready Software
• Web GUI Configuration Tool and Smart Defaults
• Software-Based Transcoding and Media Handling
  – Transcoding Will Impact Session Capacity

• All Other Features Comparable to Vega eSBC Appliance
Vega VM/Hybrid Enterprise SBC

- Supports 25-500 Sessions
- VM/Hybrid Functions Exclusive to Sangoma
  - Maintains SBC In Software/VM
  - Media Functions are offloaded to an external Hardware Resource
  - Multiple external hardware resources cost-effectively enables up to 500 sessions
ADVANTAGES OF THE SANGOMA LINE OF SESSION BORDER CONTROLLERS
Sangoma SBC Advantage

• Browser-Based GUI
• VM and the VM/Hybrid Options
• Simple Licensing
  – Simple per session licensing
    • No Per Feature, Per User or Per Codec licensing
  – Predictable SBC capacity and cost in every use case
VM and VM/ Hybrid - Benefits

• VM
  – For customers already using VMs, they do not have to add another server to their infrastructure
  – VM Infrastructure provides unmatched flexibility, redundancy and durability
  – VM instance can be moved, copied and backed up
  – VM offers upgrades with minimal down time by allowing IT to build and test new VM before shutting down production systems

• VM/ Hybrid
  – SBC is maintained Virtual Machine with all associated benefits
  – Offloading Media RTP to a hardware resource reduces load on SBC for maximum scalability
  – Future versions will allow sharing of hardware resources for maximum resiliency and efficiency
CLOSING
Summary

• Sangoma has a wide range of flexible SBCs, scalable from small enterprise to large carrier
• Easy licensing and field upgradeable
• Full feature set
• Cost effective compared to competition
The Sangoma Advantage

What differentiates Sangoma SBCs from the Competition?

• Focus on Ease of Installation and Operation
• Highly Reliable
• 25+ years of industry experience
• Professional support
• Dedicated to Highest Quality Products at Reasonable Price Points
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