Cost Effective Tapping and Call Recording using the Sangoma T116

April 2013
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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
- Software Applications
  - NetBorder Express
  - Call Progress Analyzer
  - Lyra AMD for Asterisk
- VoIP Gateways
  - SIP-to-TDM
  - TDM-to-SIP
  - SS7-to-SIP
- Session Border Controllers
- Microsoft Lync
- Wireless Products
- 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

## Proprietary PBX and IVR
Plug-in to major soft-PBX and IVRs
- Microsoft Lync™
- Barracuda Networks
- snom
- Aastra
- 3CX
- Fonality
- INTECH
- Nucleum

## Contact Center
OEM Integration with major software suites
- ORACLE
- inContact
- GENESYS
- OreCX
- Alteor

## Carriers, Cloud, Data Ntwks
Proven Infrastructure Technology
- BT
- Verizon
- Siemens
- TELUS
- NOKIA
- CISCO
- MTT

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Tapping

- Tapping includes gather information from both the Media and the Signaling of a call
  - Voice and Media
  - Call Control information
  - Telecom Protocol information
Reasons for Tapping

• Fraud detection
• Quality monitoring in call centers (recording)
• Call logging for financial institutions
  – Order Verification
• Security
Two Ways Of Tapping

• Active Tapping
  – Tapping Equipment is part of the audio and signaling path of the call

• Passive Tapping
  – Tapping Equipment is “in parallel” with the audio and signaling path of the call
• Terminate and re-originate calls in-line
• If Tapping Server fails, so does the end to end call
Passive Tapping

Capturing telecom information from a standard installation without disrupting normal operations.
Active vs. Passive Tapping

Active

Pro
• Less Cabling
• Easier to Set-Up

Con
• Becomes a single point-of-failure in the network

Passive

Pro
• Failure of the tapping system will not impact the call flow

Con
• Requires special cabling
• Can be more complex to set up
There is a third way

- Telco or PBX forking
  - Sometimes, the Telco offers a service where a duplicate of the live call is provided
  - No need for a special tap in this case
...and VoIP Tapping

• As networks are moving to VoIP, tapping solutions also need to follow this migration

• Some solutions involve using ‘capturing probes’ connected to Router Mirror Ports
  – Required a lot of downstream processing to filter out voice ‘bits’ only

• More efficient solutions using Session Border Controllers with SIP forking
  – SBC are in the call
  – SIP aware; record what is required only
SETTING UP A PASSIVE TAP
Basic Passive Tap

- PSTN or PLMN
- 1 T1/E1 under TAP
- RJ45 cables
- Rx side only

PBX / Call Center

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Passive Tap Connection

• To be passive, connection needs to have high impedance
  – Can be done at the Tapping connection or via Sangoma Boards configurations

• Build you own or use the Sangoma TAP Box
  – Part number: TAP
  – List Price: $150 USD
  – 1 TAP box required for each T1/E1
Using two span boards

PSTN or PLMN

Can only use Receive side (Tx ports unused)

Rx = Receive
Tx = Transmit

T1/E1 is 4 wires

Port 1
Rx

Port 2
Rx

1 Span TAP = 2 span board (A102)
2 Span TAP = 4 span board (A104)
4 Span TAP = 8 span board (A108)

* Echo Cancellation not required
Sangoma Tapping Solutions

• All Sangoma Digital Spans boards:
  – A102
  – A104
  – A108
  – A116
  – The new T116

• Tapping Box Accessory

• SDK/API
  – LibSangoma + LibStelephony
  – FreeTDM

• Open Source Frameworks
  – Asterisk
  – FreeSWITCH
Sangoma Libraries and Drivers

Opensource Frameworks

- Asterisk
  - Dahdi
  - libSangoma
  - Wanpipe

- Freeswitch
  - FreeTDM
  - libSangoma
  - Wanpipe

Dedicated Apps

- Tapping Application
  - Sangoma Tapping
    - libSangoma
    - Wanpipe

- Tapping Application
  - libSangoma
  - Wanpipe
Wanpipe Configuration

• Wanpipe® is Sangoma’s hardware driver
  – WANPIPE® routing stack is completely independent of TDM voice application for total system reliability
  – WANPIPE® supports certified, field-tested, and reliable Frame Relay, PPP, HDLC, and X.25

• Configuration:
  – Interface in TDM_VOICE mode
  – TE_HIGHIMPEDANCE = YES

• Sample configs available:
  – http://wiki.sangoma.com/sangoma-tap-system
T116 HIGH DENSITY TAPPING BOARD FROM SANGOMA
Product Positioning

The only high-density, globally available, dedicated tapping board enabling easy development of applications.
T116 – Tapping Board Features

• E1/T1/J1 Compatible
  – 8 two-way connections
  – 16 one-way connections
• 2U Form factor: 120 mm x 55 mm for use in restricted chassis
• Supports Robbed Bit Channel Associated Signaling (CAS) and ISDN PRI
• T1/E1 and fractional T1/E1, multiple channel HDLC per line for mixed data/TDM voice applications
• Both Windows and Linux support
Density and Scalability

• Sangoma has verified operation of up to six (6) boards in a single chassis
• Monitor up to 96 spans from a single appliance
  – Monitor up to 2,880 one-way sessions
  – Monitor up to 1,440 two-way sessions
TAP Box Placement in the Circuit

- PSTN or PLMN
- 1 T1/E1 under TAP
- RJ45 cables
- TAP
- RJ45 cables
- T116
- PBX / Call Center
Splicing For T116

- Each connector on the T116 accepts four T1/E1 receiver pairs
- Four twisted pairs are spliced to each RJ-45 to achieve full capacity
PRICING AND SKUS
# Pricing and SKUs

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<thead>
<tr>
<th>SKU</th>
<th>Description</th>
<th>List Price (USD)</th>
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<tbody>
<tr>
<td>T116</td>
<td>16 Span, PCI-Express Tapping Board</td>
<td>$3195</td>
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<tr>
<td>TAP</td>
<td>T1/E1 Cable Tapping Adaptor</td>
<td>$150</td>
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<tr>
<td>SKU</td>
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</tr>
<tr>
<td>A102</td>
<td>2 span board, PCI bus</td>
<td>$1000</td>
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<tr>
<td>A102E</td>
<td>2 span board, PCI Express bus</td>
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</tr>
<tr>
<td>A104</td>
<td>4 span board, PCI bus</td>
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<tr>
<td>A104E</td>
<td>4 span board, PCI Express bus</td>
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<td>A108</td>
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</tr>
<tr>
<td>A108E</td>
<td>8 span board, PCI Express bus</td>
<td>$2900</td>
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</table>
Density and Price Comparison

Number of boards required to record 240 conversations (8 spans)

<table>
<thead>
<tr>
<th>SKU</th>
<th>Spans</th>
<th>Boards Required</th>
<th>Cost ($USD)</th>
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<tbody>
<tr>
<td>T116</td>
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<td>1</td>
<td>$ 3195</td>
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<tr>
<td>A108/E</td>
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<tr>
<td>A102/E</td>
<td>2</td>
<td>8</td>
<td>$ 8000</td>
</tr>
</tbody>
</table>
CLOSING
Product Highlights – Review

• E1/T1/J1 Compatible
  – 8 two-way connections
  – 16 one-way connections

• 2U Form factor: 120 mm x 55 mm for use in restricted chassis

• Supports Robbed Bit Channel Associated Signaling (CAS) and ISDN PRI

• T1/E1 and fractional T1/E1, multiple channel HDLC per line for mixed data/TDM voice applications

• Both Windows and Linux support
The Sangoma Advantage

• Focus on Ease of Installation and Operation
• Proven high reliability
• 25+ years of industry experience
• Professional support available
• Dedicated to highest quality products at reasonable price points
• Passive tapping useful for many applications
• Passive/high impedance connection
  – Tapping box from Sangoma
• Use T116 for dedicated solution, highest density and best ROI available
• Several options for maximum flexibility
  – API/SDK
  – Apps
  – Open Source Frameworks
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THANK YOU