VoIP & Internet Telephony

Peter Gradwell

www.gradwell.com
01225 800 800

3-3a Gloucester St, Bath, BA1 2SE
Gradwell dot com Ltd

- Founded 1998 whilst at University
- 7 Staff
- Bath, Bristol, ‘op north’
- We operate the BCS lifetime email service @bcso.org.uk
- This seminar is test marketing!

Peter Gradwell

- Industry Involvement in domain names (co.uk)
- Now moved onto OFCOM
- Still a part time academic

www.gradwell.com
VoIP
Voice over IP
Internet Telephony
IP Phones

www.gradwell.com
Internet Rules Apply

• Distance isn’t an issue
• Pay for what you use, rather than how long you use it for
• Plug-in “anywhere”
Different Types of VoIP
Consumer Services

- No line rental
- Unlimited Calling
- VoiceMail
- “Adaptor”
- or “Softphone”
Messaging + Talk

- Software Phones
- Can provide World Wide Phone numbers
- “Dual Phone” makes it “real”

www.gradwell.com
Big Business / PBX Replacement

- Businesses with >10 people
- Multiple Sites – Free Calls
- Existing PBX Infrastructure

- Anyone with a multi-site corporate network does this already
IP Centrex

• “PBX In the Sky”
  – Multiple Sites, Multiple Countries
• Small Business Phone Systems
• One phone on each desk
• Each phone has a dedicated number (DDI)
• Call routing is done centrally
• Everyone is on the same “system”
IP Centrex - Gradwell

- Has a “phone number”
- Make & Receive Calls to PSTN
- It can “look” like a phone
- Works across multiple internet connections
Clever Numbers

• A Londoner can have an Edinburgh Phone Number
• Work from your Spanish villa, whilst in Birmingham
• An Englishman in Madrid can call a Chinese distributor with a US phone number (for free!)
How does it work?

SIP phones have **user names** & **passwords** and login to the SIP gateway

www.gradwell.com
SIP INVITE Message

• INVITE sip:01772624123@lon-pbx-1.gradwell.net SIP/2.0.
• To: <sip:017726241223@lon-pbx-1.gradwell.net>.
• From: Mark<sip:2044123@lon-pbx-1.gradwell.net>;tag=e4b18b05.
• Call-ID: 0610079e3ba17c673f602ceb79c4aed3.
• Allow: INVITE, ACK, CANCEL, OPTIONS, BYE, REFER, NOTIFY, MESSAGE, SUBSCRIBE, INFO.
• User-Agent: eyeBeam release 3004w stamp 16863.
ENUM / Peering

• Phone numbers as domain names

• 01225 800 810 becomes
  – 0.1.8.0.0.8.5.2.2.1.4.4.e164.arpa.

• When I look this up I find
  – TEL: 079700NNNNNN
  – SIP: 1000200@sip.gradwell.net

• I can now choose to route the call over SIP

• Coming to a BT phone number late 2006…
Universal Numbers?

- Can you dial sip:peter@gradwell.com

- Yes – just do a lookup for the ENUM Records on gradwell.com and make a call to “peter”.

- Peter = 1000200
Set it up yourself!

- Home SOHO PBX
- www.asterisk.org
- Asteriskathome.sourceforge.net
- ISDN / POTS Cards
- DUNDI – Intelligent Local Routing
Marketing Consultancy

• 4, growing to 8 staff
• On the road lots
  – SMS
  – VoiceMail
• Mobile – so use of Software Phone
• Adopted VoIP due to Quick Setup & Flexibility
Marketing Consultancy Setup

- Main Phone Number routes to all after a “welcome” message
- Mobile divert displays the caller id of the original caller

3 Inbound Phone Numbers (01242)

www.gradwell.com
IT Consultancy

• 4 staff working from home
• Use of “virtual numbers”
• Intelligent Routing
• SMS and VoiceMail
• Call Transfer
• Ad-Hoc 3 Way Conferencing
IT Consultancy Setup

- Individual DDI routes:
  - Phone
  - Everyone
  - Voicemail
Tech Support Setup

IVR Menu 201 8577

Name: Main Menu
Email: team@incite-ict.com
Message on answer: Welcome to Incite ICT...
Message on invalid/no response: Welcome to Incite ICT...

Actions

<table>
<thead>
<tr>
<th>Digit</th>
<th>Action</th>
<th>Delete</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>201 8575 (Group) Support <a href="mailto:team@incite-ict.com">team@incite-ict.com</a></td>
<td>✔️</td>
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<td>3</td>
<td>201 8570 (Ext) Ryan Cole <a href="mailto:ryan.cole@incite-ict.com">ryan.cole@incite-ict.com</a></td>
<td>✔️</td>
</tr>
<tr>
<td>4</td>
<td>201 8571 (Ext) Matthew Slight <a href="mailto:matthew.slight@incite-ict.com">matthew.slight@incite-ict.com</a></td>
<td>✔️</td>
</tr>
<tr>
<td>5</td>
<td>201 0573 (Ext) Anish Deriwala <a href="mailto:anish.deriwala@incite-ict.com">anish.deriwala@incite-ict.com</a></td>
<td>✔️</td>
</tr>
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<td></td>
<td>Hangup</td>
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Update

My Extensions

<table>
<thead>
<tr>
<th>Number</th>
<th>Name</th>
<th>Email</th>
<th>Online</th>
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<tr>
<td>201 0570</td>
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<tr>
<td>201 8571</td>
<td>Matthew Slight</td>
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<tr>
<td>201 0573</td>
<td>Anish Deriwala</td>
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</tbody>
</table>

Extension

<table>
<thead>
<tr>
<th>Extension</th>
<th>Days Enabled</th>
<th>Time Range</th>
<th>Order</th>
<th>Delay</th>
<th>Allow VM Delete</th>
</tr>
</thead>
<tbody>
<tr>
<td>201 8573 (Ext) Anish Deriwala (<a href="mailto:anish.deriwala@incite-ict.com">anish.deriwala@incite-ict.com</a>)</td>
<td>✔️ ✔️ ✔️ ✔️ ✔️</td>
<td>0:00 23:59</td>
<td>1</td>
<td>20</td>
<td>❌</td>
</tr>
<tr>
<td>201 8570 (Ext) Ryan Cole (<a href="mailto:ryan.cole@incite-ict.com">ryan.cole@incite-ict.com</a>)</td>
<td>✔️ ✔️ ✔️ ✔️ ✔️</td>
<td>0:00 23:59</td>
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<td>0:00 23:59</td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Add New Member: -

Update
Does it save money?

- “On-Net” calls are free – Call Other VoIP Users
- Calls are as cheap, if not cheaper (1.25ppm)
- Service is based on line rental (£7/month)
- £100 a handset on the desk
- Remove ISDN, but add bandwidth
Saving Money on Calls

Does VoIP == Free Calls?

Yes

• Many Brands are moving to “unmetered” call bundles – e.g. Wanadoo
• All “internal” calls are free
• Calls between VoIP subscribers are free
• Calls across VoIP networks are free (peering, DUNDI)

No

• Price discounting is best done by Big Telcos with volume
• Wholesale call costs are a bit “funny”
• New York is cheaper than Edinburgh
Call Costs Example

New York
£ 0.0066
Gradwell: NY: 1.5ppm
BT: NY: 15ppm

Scotland
£ 0.0075
UK: 1.25ppm

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Significant Benefits

• Big Offices – costs are on a par

• Much more flexible

• Supports better ways of working
  
  – Divert my office phone to my mobile
Does it work?

• Quality
  – Busy broadband users get poor quality
  – 3 to 4 concurrent calls on ADSL
  – Some manufacturers have variable implementations
  – A call is 80kbps, ADSL upstream is 256kbps

  – Some customers have 10 phones and spend 5 hours a day on phone
Does it work? (2)

• Can be fiddly to setup
  – Firewalls
  – Routers
  – Broadband
  – Getting the right combination

• We are approaching 24 months operational experience

• Moving very fast
Government

- 999
- Interception
- Quality
- Phone Numbers

www.itspa.org.uk
Interception of VoIP

The “media path” of the phone call can by-pass the VoIP Provider
999 Call Handling (Normal)

Emergency Location Information Interface
www.nicc.org.uk

www.gradwell.com
999 Call Handling (VoIP)

VoIP Phone
01225 800 810
192.168.1.5

PC

ADSL Router
gradwell@aaisp
217.169.23.65

BT PSTN Number
01249 715345
applied to BT Circuit at exchange.

BT DSLAM

BT ADSL Network
ADSL Line encapsulated inside L2TP Virtual Path

ISP Router

VoIP Provider Server

Internet

ISP identifies circuit by ADSL user name and applies ip routing
gradwell@aaisp
CBUK1234
217.169.23.65
01249 715664

BT Circuit has ID number

BT Circuit has ID number

PSTN 999 Call taken off to SS7 network

VoIP Provider just knows IP address + VoIP Phone Number
217.169.23.65
01225 800 810

999 Via BT Interconnect

999 Call Handling (VoIP)
Where Next?

• US & European Numbers
• Better Quality + Handsets
• Ease of Use

• “Triple Play” – Line Rental, Broadband, Calls
Conclusions

• Most gain is the call handling flexibility
• Inter-site call costs
• Good deals will cut call costs – especially for consumers
• Plenty of technical issues left! (But it does now work!)
Homework!

- 10 Things You Need to Know Email
- Register for Free Trial
- View the phones

http://www.gradwell.com/voip/
please let us know if we can be of assistance

www.gradwell.com/voip
01225 800 800
info@gradwell.com