



IPv6 Readiness GO Telecom

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IPv6 Task Force 11th Meeting – 16th May 2012



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Etihad Atheeb Telecom Company

Agenda



- **Introduction**
 - Go Telecom
 - Fixed-line & Broadband Market
 - IPv6 Driver
- **GO IPv6 Readiness**
 - E2E Telecom Network
 - 6PE Tunneling Technique
 - IPv6 Deployment – Progress
 - IPv6 Deployment – Next Step





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Introduction



5/16/2012

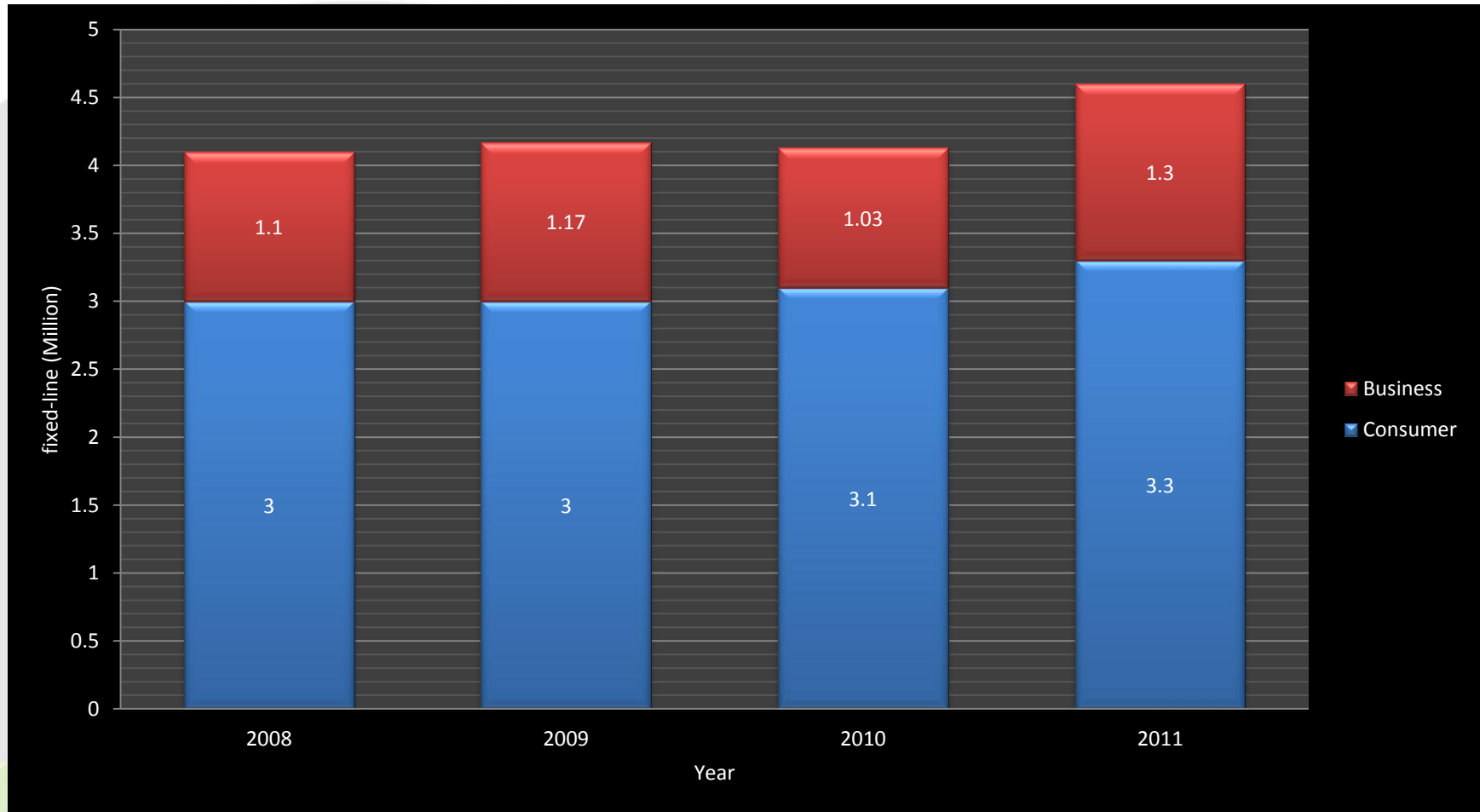
Confidential

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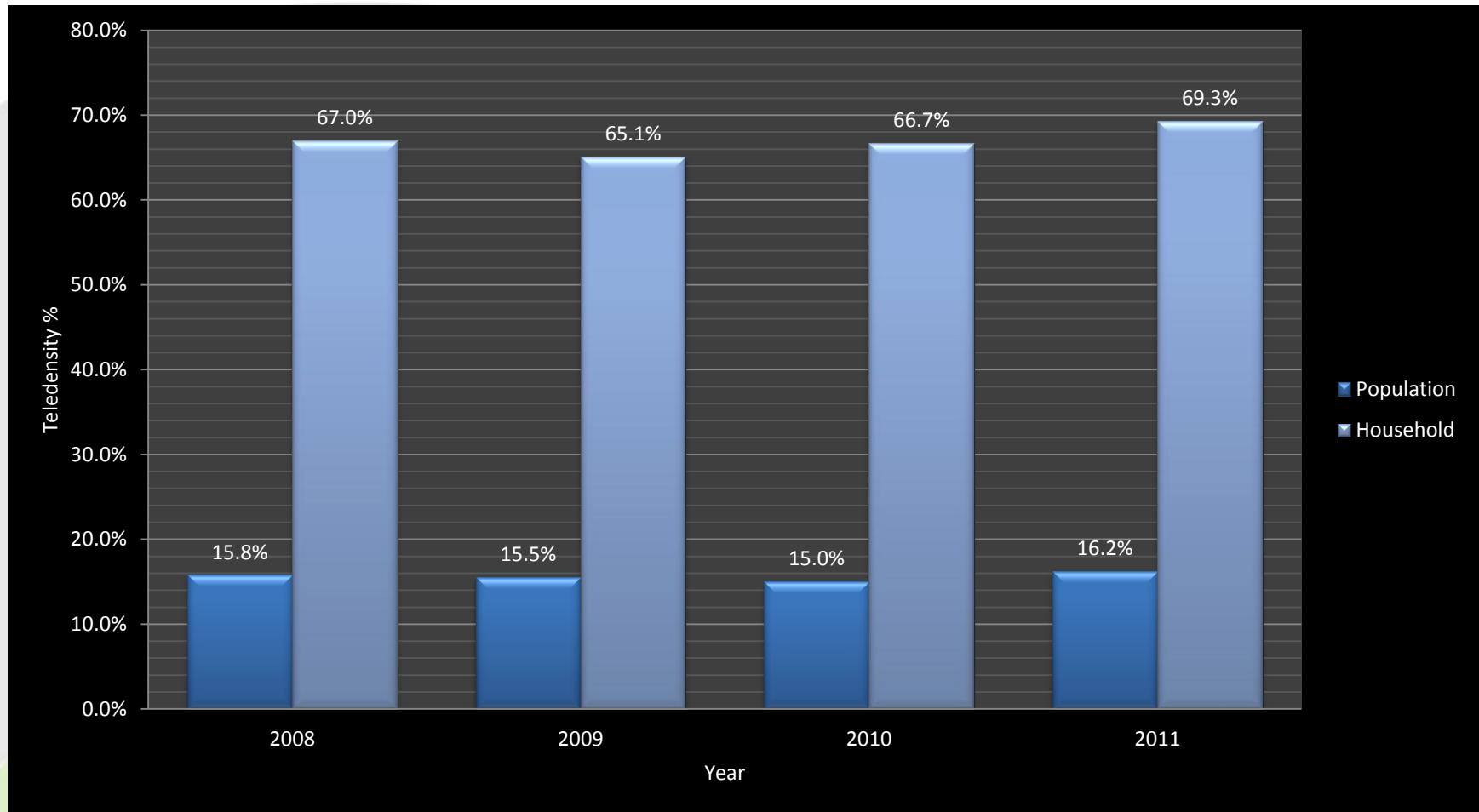


- Etihad Atheeb Telecom Company
- Launched in 2009 as second fixed telecommunication licensed operator (Nomadic) in KSA
- Broadband internet & voice service in 11 cities in KSA
- 2 x 28 MHz of spectrum in the 3.5GHz frequency band
- More than 150 thousand customers
- Targeting the B2C, B2B, SME & Wholesales markets

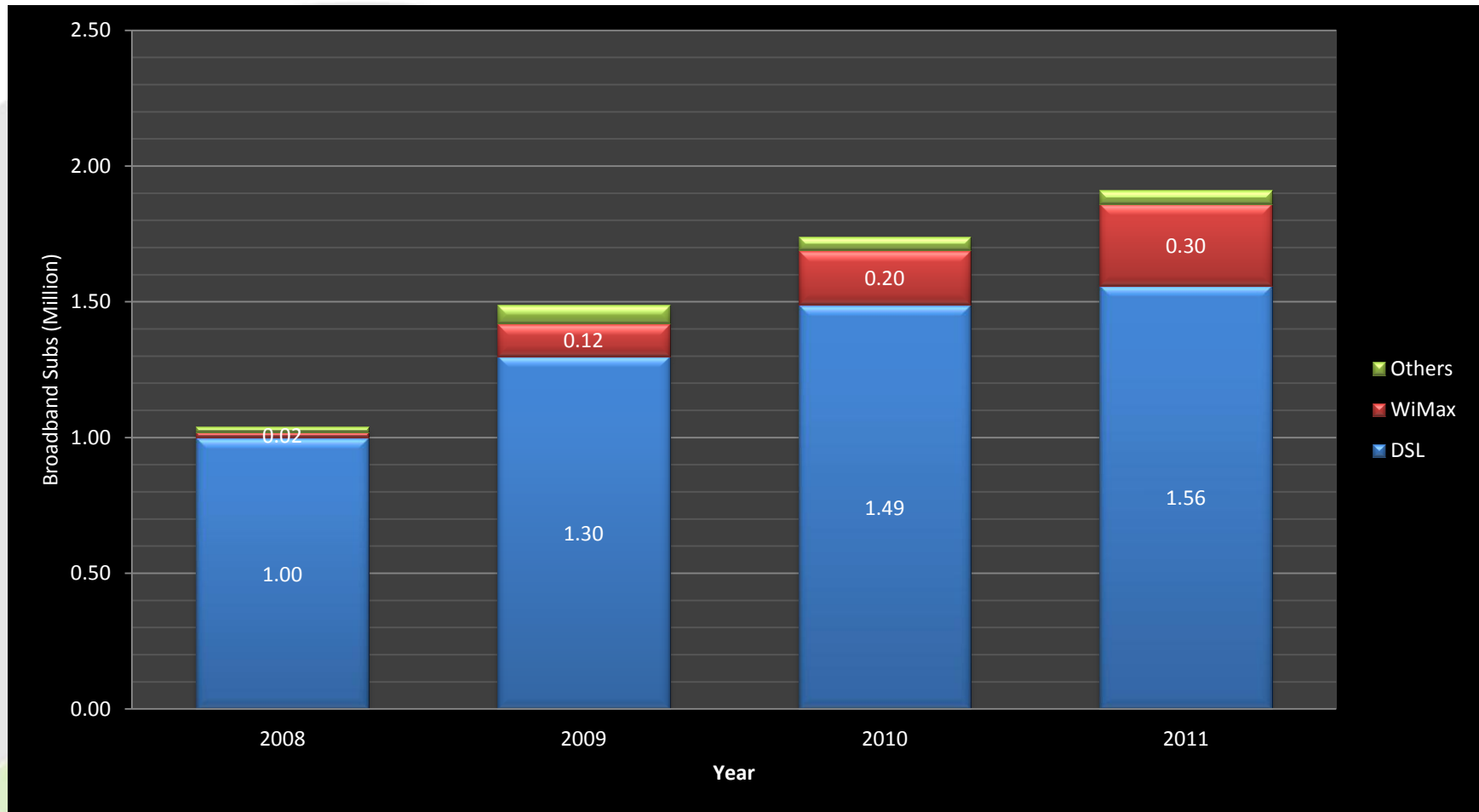
Fixed-line Market



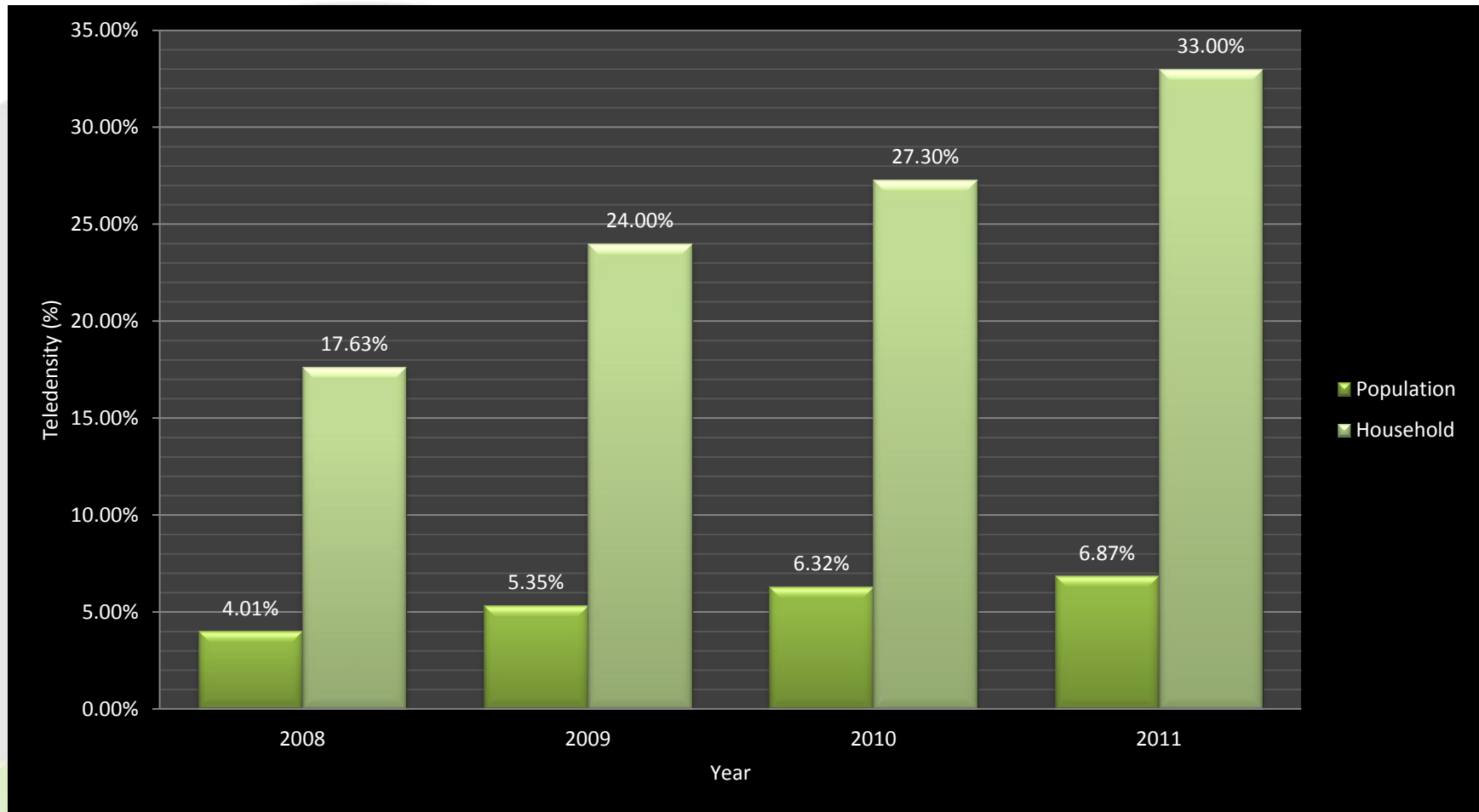
Fixed-line Teledensity



Fixed Broadband Market



Fixed Broadband Teledensity





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IPv6 Driver ...



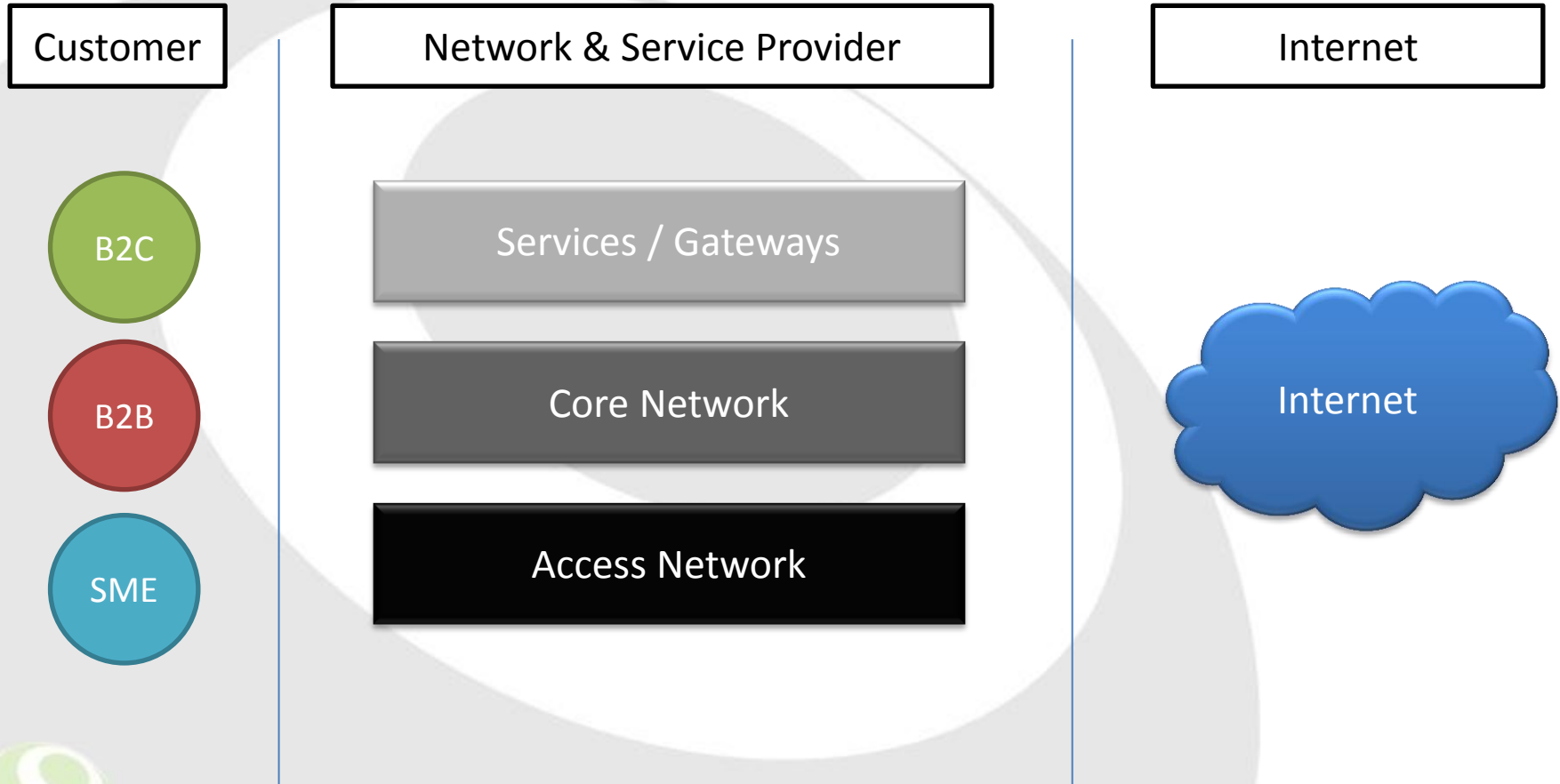
- Growth in customer, traffic and services while IPv4 is depleted
- Content & service provider will ultimately convert to IPv6
- Increase staff practical experience and awareness of IPv6
- Identify gaps & weakness in the infrastructure and plan accordingly
- Improve customer experience by eliminating IPv4 issues



GO IPv6 Readiness



End-2-End Telecom Components



Customer Premises Equipment



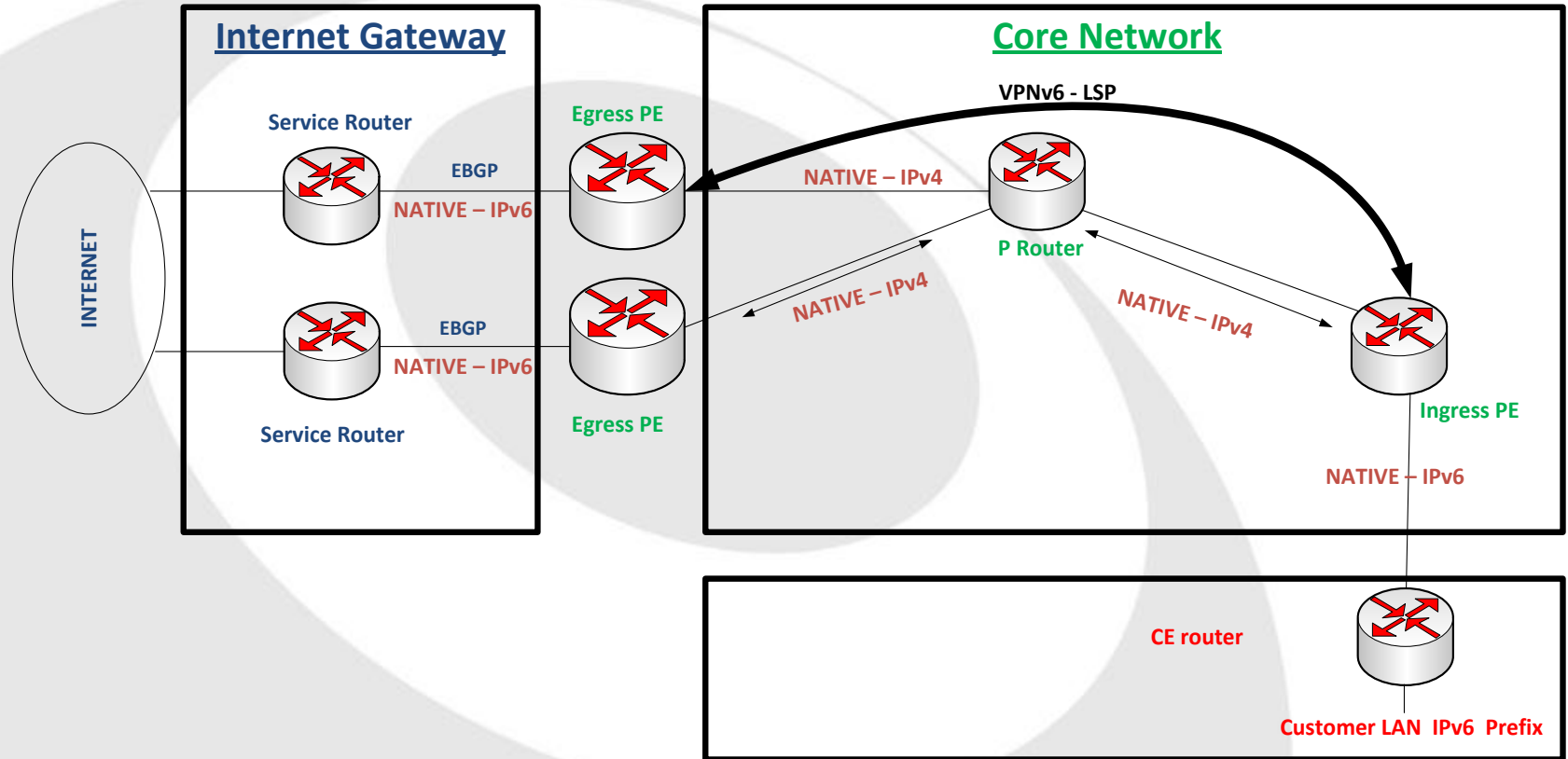
- USB Dongle, WiMAX CPE, Voice IAD etc
- For USB Dongle, it depends on the OS the end user is using
- WiMAX CPE & Voice IAD needs to support dual stack
- Working with our suppliers to determine which
 - CPE can be upgraded remotely,
 - CPE will require manual intervention to complete manual upgrade,
 - CPE need to be replaced

Network & Service Provider



- Access & Core network, 6PE tunneling technique will be used
- The core network has been divided into 18 POP sites, the 6PE will be implemented gradually on all POP sites
- The Ingress PE & Egress PE need to be dual stacked (IPv4 & IPv6) capable. The tunnel will be created between the Ingress and Egress PEs
- The Egress PEs will then talk native IPv6 with the Services and Gateways (Data & Voice)
- Internet gateway are fully supporting dual stack

6PE Tunneling





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IPv6 Deployment – Progress



- IPv6 peering with the upstream provider has been established
- IPv6 address plan has been finalized
- Testing for 6PE tunnel for the first POP site started and will be completed in Q2 2012
- Lab environment in the internet gateway has been prepared and it is being tested by design and operation team
- Go web site is accessible through IPv6
- Internal IPv6 task force has been formalized to cross check all infrastructure areas from all aspects (design, planning, security, operations an so on)

IPv6 Deployment – Testing



GO IPv6 Prefix

2a02:888::/32

- BGP Test

```
inet6.0: 10801 destinations, 23729 routes (10593 active, 4 holddown, 2670 hidden)
+ = Active Route, - = Last Active, * = Both
```

2a02:888::/32

```
*[BGP/170] 16:05:48, MED 0, localpref 150, from 80.91.255.114
AS path: 6762 47794 I
to 80.91.250.234 via ge-6/0/0.0, Push 2, Push 327676(top)
to 80.91.250.238 via ge-6/1/0.0, Push 2, Push 716296(top)
to 80.91.249.77 via ge-5/0/0.0, Push 2, Push 327676(top)
to 80.91.254.21 via ge-5/1/0.0, Push 2, Push 716296(top)
> to 80.91.249.133 via ge-3/3/0.0, Push 2, Push 716296(top)
to 80.91.249.131 via ge-2/3/0.0, Push 2, Push 327676(top)
to 80.91.251.18 via ge-7/0/0.0, Push 2, Push 327676(top)
to 80.91.251.14 via ge-7/1/0.0, Push 2, Push 716296(top)
```


IPv6 Deployment – Testing



From	GO server	2a02:888:ffff:ffff:ffff:ffff:ffff:fffe
To	London server	2001:2000:3018:4::1

- PING Test

```
[root@RIY1-Server ~]# ping6 2001:2000:3018:4::1
PING 2001:2000:3018:4::1 (2001:2000:3018:4::1) 56 data bytes
64 bytes from 2001:2000:3018:4::1: icmp_seq=0 ttl=60 time=168 ms
64 bytes from 2001:2000:3018:4::1: icmp_seq=1 ttl=60 time=167 ms
64 bytes from 2001:2000:3018:4::1: icmp_seq=2 ttl=60 time=167 ms
64 bytes from 2001:2000:3018:4::1: icmp_seq=3 ttl=60 time=184 ms
```

```
--- 2001:2000:3018:4::1 ping statistics ---
```

```
4 packets transmitted, 4 received, 0% packet loss, time 3001ms
rtt min/avg/max/mdev = 167.948/172.064/184.171/6.996 ms, pipe 2
```

IPv6 Deployment – Testing



From	GO server	2a02:888:ffff:ffff:ffff:ffff:ffff:fffe
To	London server	2001:2000:3018:4::1

- Traceroute Test

```
[root@RIY1-Server ~]# traceroute6 -n 2001:2000:3018:4::1
traceroute to 2001:2000:3018:4::1 (2001:2000:3018:4::1), 30 hops
max, 40 byte packets
 1  2a02:888:ffff:ffff:ffff:ffff:ffff:fffd  0.279 ms  0.251 ms
0.285 ms
 2  2a02:888:ffff:ffff:ffff:ffff:ffff:fffa  0.275 ms  0.262 ms
0.319 ms
 3  2001:41a8:40:2::51  102.353 ms  102.393 ms  102.423 ms
 4  2001:41a8:600::1e  155.910 ms  150.143 ms  150.122 ms
 5  2001:41a8:600:2::16  157.864 ms  2001:41a8:600:2::5e  150.815
ms  150.805 ms
 6  2001:2000:3018:4::1  167.729 ms  167.458 ms  170.019 ms
```



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IPv6 Deployment – Testing



From	London server	2001:2000:3018:4::1
To	GO server	2a02:888:ffff:ffff:ffff:ffff:ffff:fffe

- PING Test

```

PING6(56=40+8+8 bytes) 2001:2000:3018:4::1 -->
2a02:888:ffff:ffff:ffff:ffff:ffff:fffe 16 bytes from
2a02:888:ffff:ffff:ffff:ffff:ffff:fffe, icmp_seq=0 hlim=59
time=167.237 ms 16 bytes from
2a02:888:ffff:ffff:ffff:ffff:ffff:fffe, icmp_seq=1 hlim=59
time=166.827 ms 16 bytes from
2a02:888:ffff:ffff:ffff:ffff:ffff:fffe, icmp_seq=2 hlim=59
time=166.989 ms 16 bytes from
2a02:888:ffff:ffff:ffff:ffff:ffff:fffe, icmp_seq=3 hlim=59
time=166.896 ms 16 bytes from
2a02:888:ffff:ffff:ffff:ffff:ffff:fffe, icmp_seq=4 hlim=59
time=166.678 ms --- 2a02:888:ffff:ffff:ffff:ffff:ffff:fffe ping6
statistics --- 5 packets transmitted, 5 packets received, 0%
packet loss round-trip min/avg/max/std-dev =
166.678/166.925/167.237/0.186 ms

```

IPv6 Deployment – Testing



From	London server	2001:2000:3018:4::1
To	GO server	2a02:888:ffff:ffff:ffff:ffff:ffff:fffe

- Traceroute Test

```

traceroute6 to 2a02:888:ffff:ffff:ffff:ffff:ffff:fffe
(2a02:888:ffff:ffff:ffff:ffff:ffff:fffe) from 2001:2000:3018:4::1, 64 hops
max, 12 byte packets
1 prs-b7-v6.telia.net (2001:2000:3018:18::1) 8.295 ms 26.123 ms 34.335 ms
2 telia.parigi52.par.seabone.net (2001:41a8:200:2::2d) 12.934 ms
telia.parigi52.par.seabone.net (2001:41a8:200:2::9) 10.439 ms 8.012 ms
3 pall-loop0-v6.pal.seabone.net (2001:41a8:40::1) 60.937 ms 61.330 ms 61.051
ms
4 2a02:888:ffff:ffff:ffff:ffff:ffff:fff9
(2a02:888:ffff:ffff:ffff:ffff:ffff:fff9) 162.698 ms 165.209 ms 162.932 ms
5 2a02:888:ffff:ffff:ffff:ffff:ffff:fffe
(2a02:888:ffff:ffff:ffff:ffff:ffff:fffe) 160.212 ms 160.516 ms 160.144 ms

```

IPv6 Deployment – Next Step



- CPE upgrade to support dual stack
- 6PE will be deployed gradually in the rest of POP sites
- E2E internet testing will be done to make sure all applications and services are running without any issue
- Assessment of internal applications to be completed
- Increase IPv6 awareness across the organization



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Thank You