Internet Evolution in Oman
9th MENOG Meeting

2011

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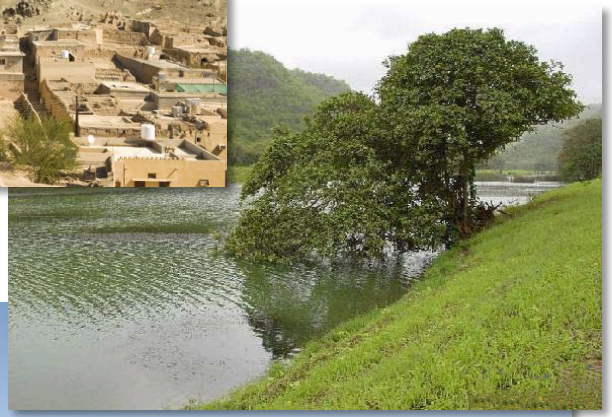
Welcome to Oman

- Culture and heritage.

- Vast areas to explore:
  - Long beaches.
  - Deserts.
  - Mountains, caves and canyons.
  - Greenery in the southern part.



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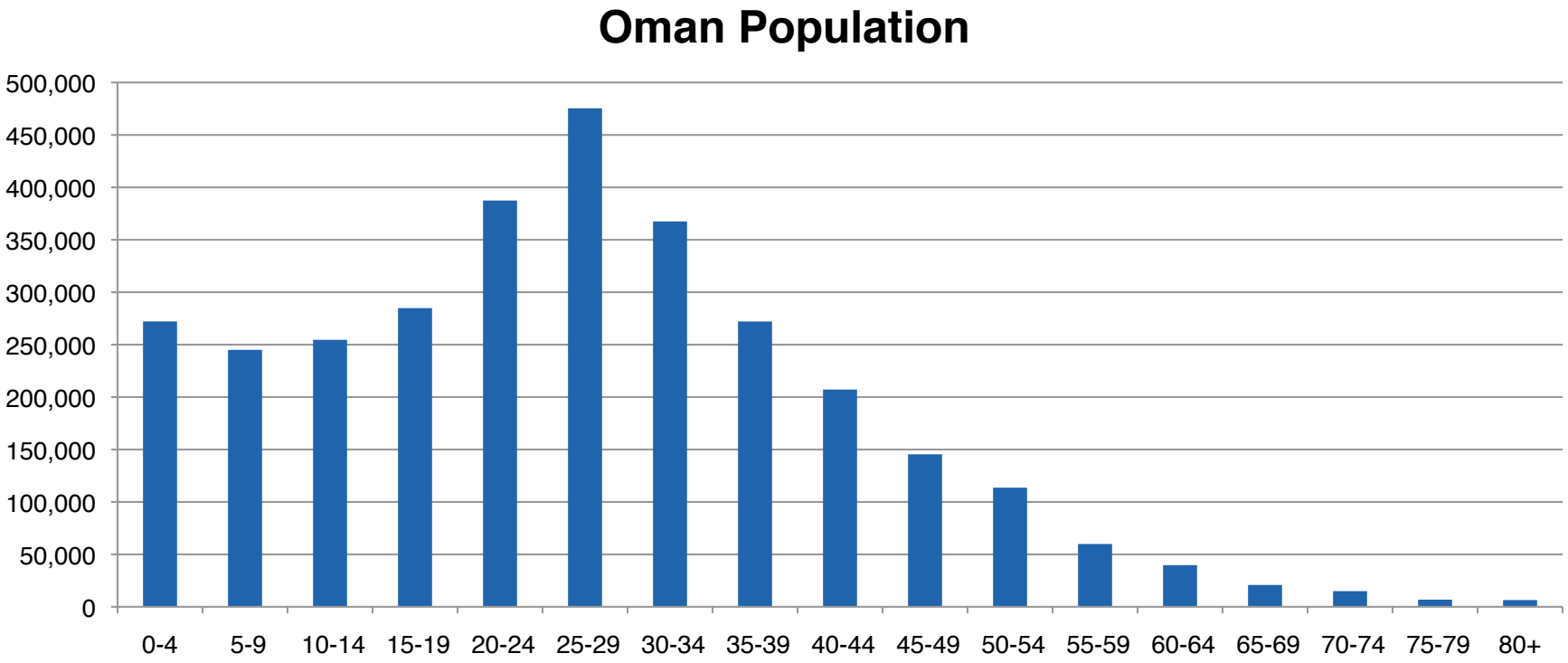
Oman From the Sky - By Avantgrade

For more information please visit:

www.omantourism.gov.om

About Oman



- Total population: 3,174,917
- 72 % of population is < 35
- 36% of population is expat
- 250k Omani will enter the job market every 5 years

Telecom Sector Overview

Earlier	OmanTel was the sole mobile and fixed operator.
2002	TRA was established to liberalize and promote telecom services in Oman.
2005	Second mobile operator (Nawras) commenced operation.
2006	Mobile Number Portability service was introduced.
2009	First Mobile Virtual Network Operator (MVNO).
2010	Second Fixed License Operator was issued to Nawras.
Today	There are 5 x MVNOs, 2 x Operators providing Fixed and Mobile services.

Evolution of Data Services in Oman

1997	Internet was launched in Oman with Dialup Service.
2004	Roll Out of ADSL Service.
2007	Nawras 3G Service.
2009	Oman Mobile 3G Service.
2010	WiMax Service – Nawras.
2010	Fiber to the Home in Green Field areas.
2011	Introduction of new unlimited broadband packages up to 24 Mbps (and up to 60 Mbps where FTTH is deployed).

Telecom Services in Oman

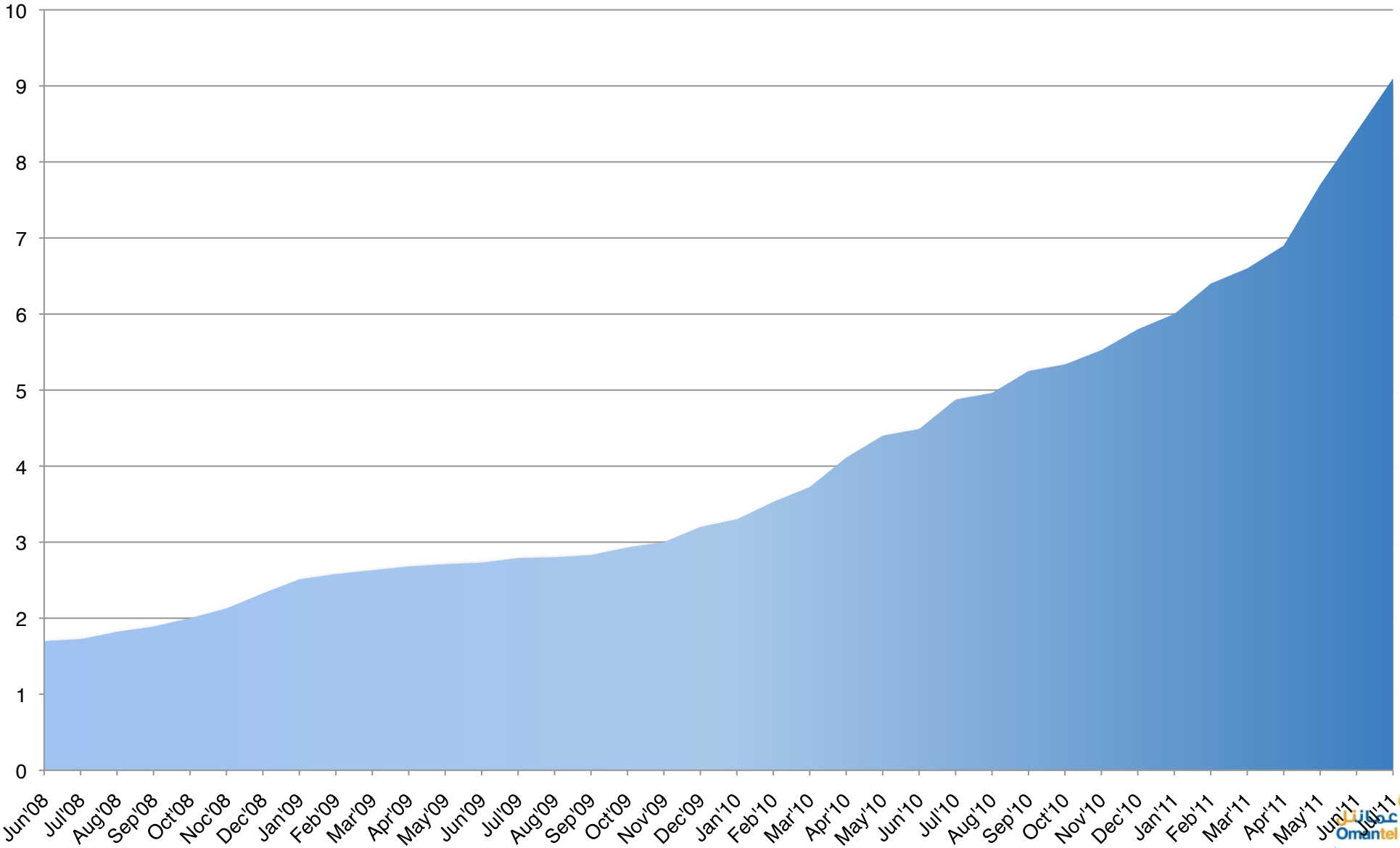
Consumer Services:

- Mobile: voice, data, Blackberry.
- Internet: ADSL / WiMax / WiFi / Dialup.
- PSTN.
- Value Added Services.

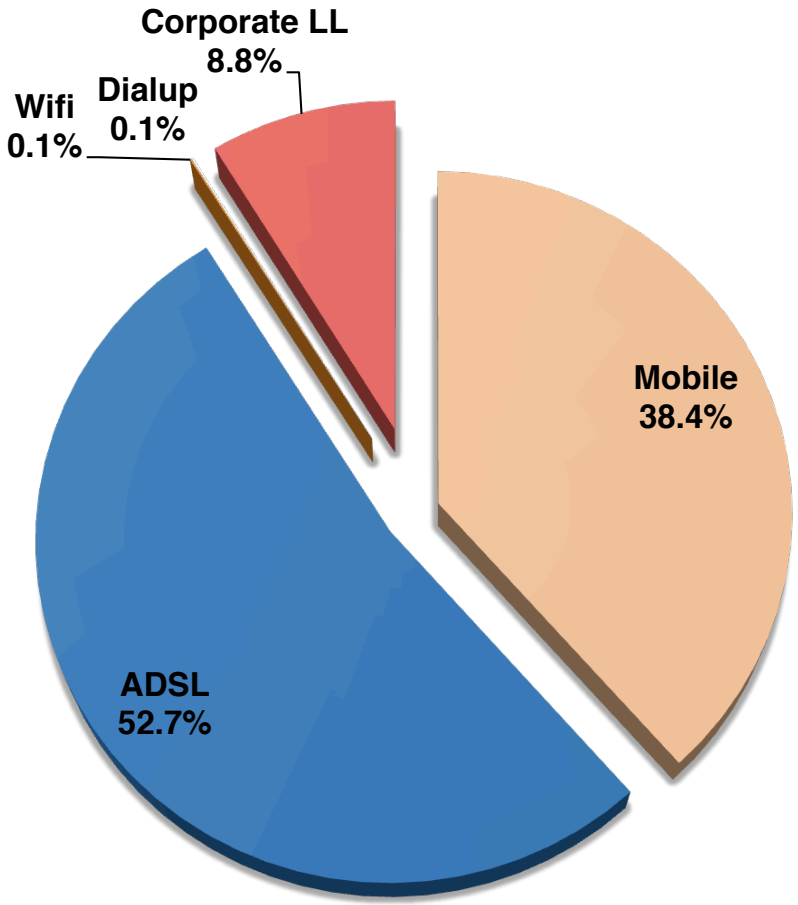
Corporate Services:

- Managed Services for MPLS and Internet Leased Line.
- Hosting Services: Email, Web and Colocation.
- Internet: ADSL / WiMax.
- VSAT.
- Mobile Business Plans.
- Blackberry.
- Closed Private Network (CPN).

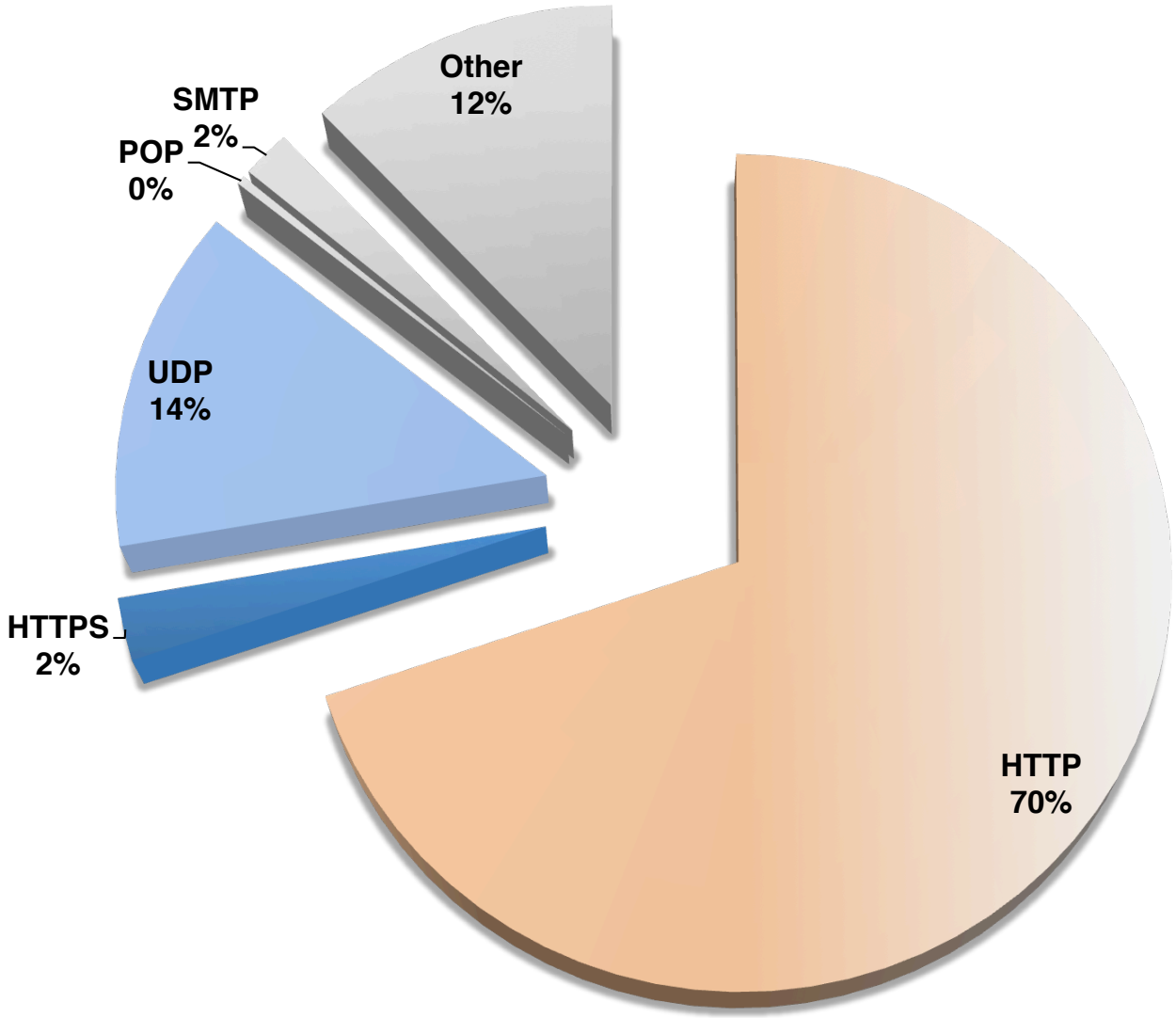
Internet Traffic Growth in Gbps (2008 – 2011)



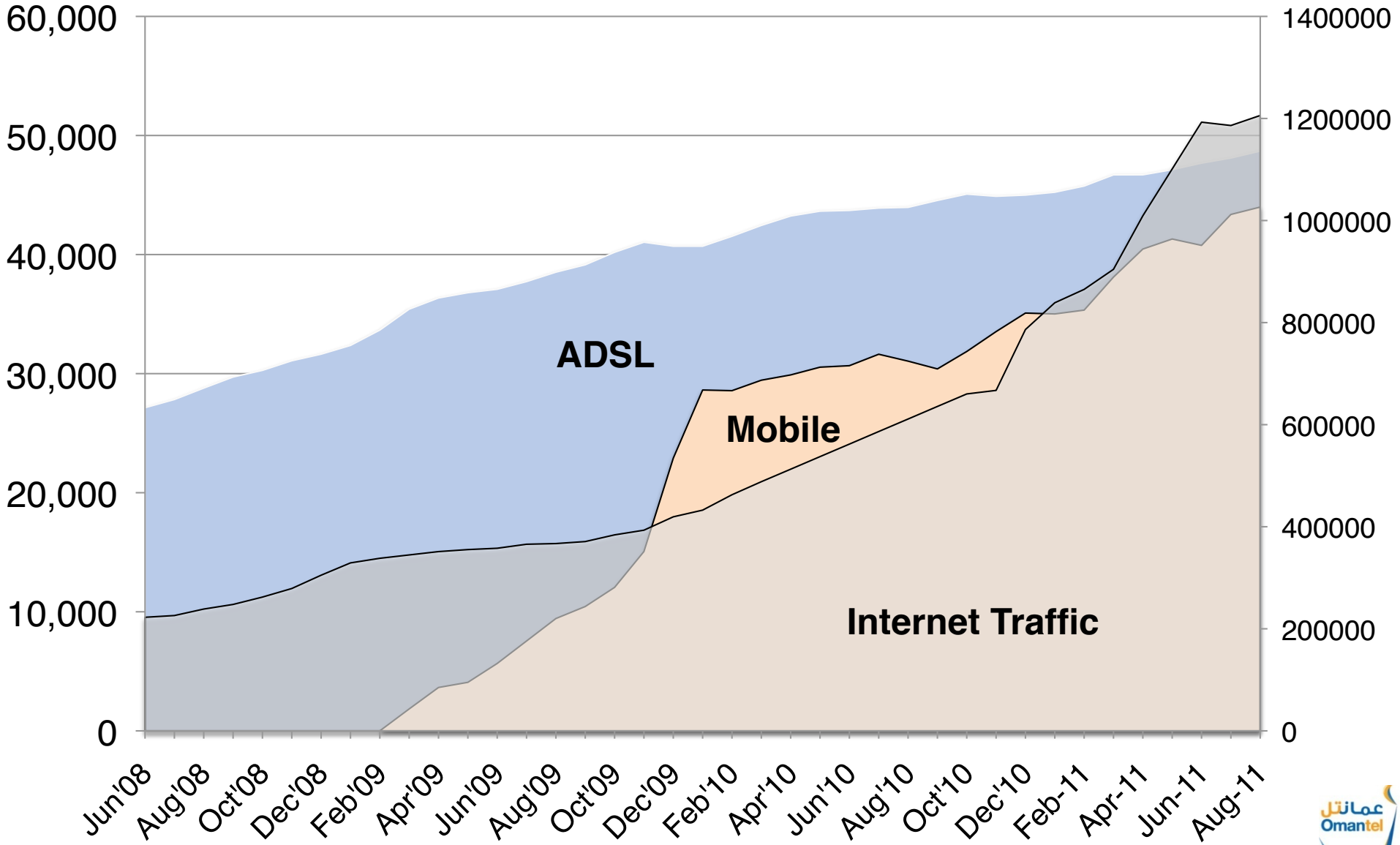
Traffic Distribution Between Services



Traffic By Type



Internet Traffic Growth (2008-2011)



Traffic Growth

Over the past two years the traffic has increased significantly.

Year	User Traffic
Sept 2009	2.8 Gbps
Sept 2011	11.2 Gbps*

That's almost 400% growth

* 2 Gbps is traffic served locally from the Google Cache.

Reasons For Growth

- Increase in number of broadband subscribers.
- Increase in the subscriber bandwidth.
- In 2009, most customers had 512 Kbps links. Today the majority start from 2 Mbps.
- Mobile broadband is the biggest contributor to the growth with mobile pre-paid and postpaid data packages.
- Some of the popular applications in the market:

Based on the traffic growth, we anticipate the traffic will increase by **200%** by the end of 2013 and the growth will mainly be driven from the mobile side.

Operational Challenges in Managing Such a Growth

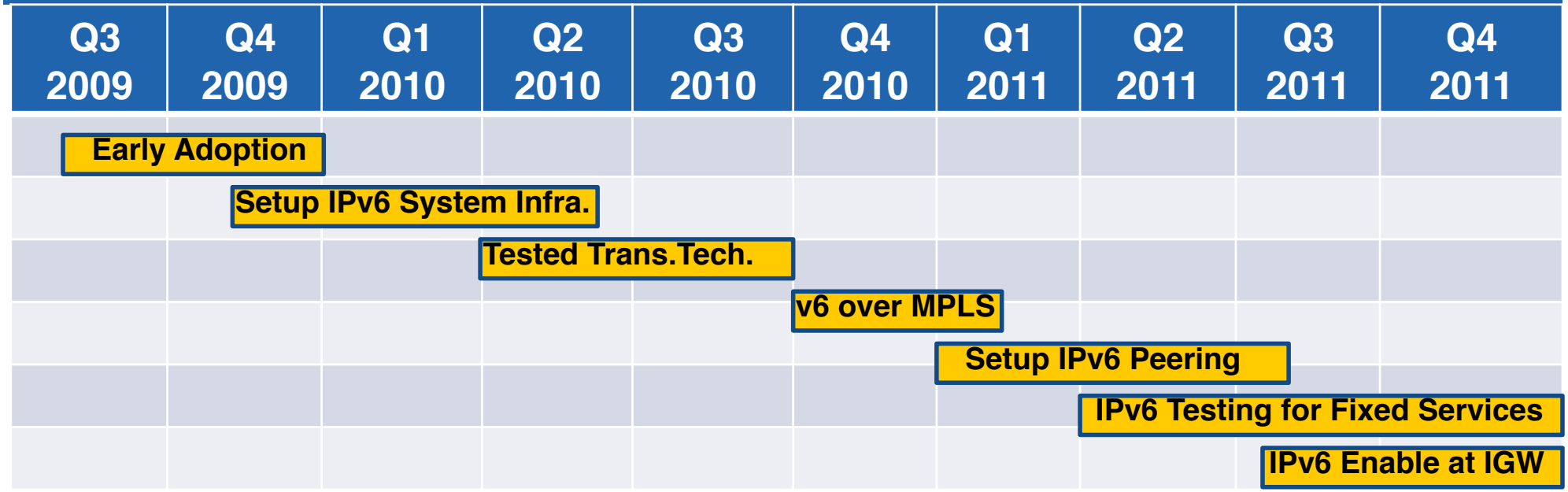
- Ensuring availability of international capacity and diversity.
- Focus on improving content delivery (reduce latency).
- The rise in the number of abuse:
  - **Spam originated from infected machines**.

Outgoing	1.3 Mn Emails Per Day
Spam	98%
Legitimate	2%

  - **Phishing Attacks.**
  - **Botnets**.
  - **Distributed Denial of Services attacks (DDOS).**
- Depletion of IPv4 Addresses and the adoption of IPv6.

The Road to IPv6

The Road Towards IPv6



Project Details	Start Date	End Date	25% 50% 75% 100%
Early Adoption (Setup IPv6 Lab)	Aug,2009	Dec,2009	100%
IPv6 System Infrastructure (DNS, MS Exchange, Publishing OmanTel IPv6 test website)	Nov, 2009	May,2010	100%
Testing Transition Technologies (6to4, 6RD, ISATAP, NAT, Dual Stack& v6 over GRE)	April,2010	Sep,2010	100%
Testing IPv6 over MPLS (6PE & 6VPE) and Basic FW	Oct ,2010	Jan,2011	100%
IPv6 Phase –I Peering with different providers (KPN, Qtel, Etisalat, Nawras and Bank Sohar)	Jan ,2011	July,2011	100%
IPv6 End-to-End testing for Fixed Services (ILL/ MPLS/xDSL) – ILL/MPLS Completed	April,2011	In Progress	75%
IPv6 Deployment at International Gateway Routers	Aug,2011	In Progress	40%

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IPv6 Roll-Out Challenges

- The availability of IPv6 Devices for Home Broadband.
- The growth of mobile subscribers and the availability of mobile devices that supports IPv6.
- The drivers towards moving to IPv6 is limited (i.e. Content, early adoption).
- Application compatibility and legacy systems.
- The regulator is taking the initiative to push operators to move towards IPv6.

Way Forward

- Continue to collaborate with other operators in order increase the footprint of IPv6 regionally and beyond.

Country	Operator	Capacity	IPv6 Peering
UAE	- Etisalat - Du	- 155 Mbps - 155 Mbps	- **Yes** - No
Qatar	- Qtel	- 12 Mbps	- **Yes**
Bahrain	- Batelco	- 4 Mbps	- No
Egypt	- Telecom Egypt	- 155 Mbps	- No

- We are discussing with the operators to establish IPv4 peering and also IPv6.

Way Forward - Cont

- Ensure network readiness by completing the testing for the major services (i.e. ADSL, Mobile).
- Continue to mandate compliance and raise awareness to vendors and partners in order to ensure IPv6 compatibility (specially for end user devices).
- Work closely with the regulator in order to support the initiative.
- Invite key organizations to participate in the testing once the remaining tests are completed.

Thank You

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