منفذ الخليج **GatewayGulf**

Internet Exchanges Briefing
Definitions & Carrier Neutrality

MENOG 2007
Doha, Qatar
November 2007

Agenda

- **Overview**

- **Context**

- **Models**

- **IXs in the Region**

Overview

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Middle East (ME) is among faster growing regions of the world

ME web users up 495% since 2000, making it 3rd fastest growing region

Region	Web Users (millions)	Growth Rate ('00-'07)	Pop. ('07 Est.)	Penetration Rate (% of pop.)
Africa	33.5	643%	933.4	3.6%
Latin America	110.0	509%	556.6	19.8%
Middle East	19.5	495%	193.5	10.1%
Asia	418.0	266%	3,712.5	11.3%
Europe	321.9	206%	809.6	39.8%
Oceania / Aust.	18.8	147%	34.5	54.5%
North America	232.7	115%	334.5	69.5%
WORLD TOTAL	1,154.4	220%	6,574.7	17.6%

Source: InternetWorldStats.com

ME will have 54M users by 2012 as lower costs drive growth
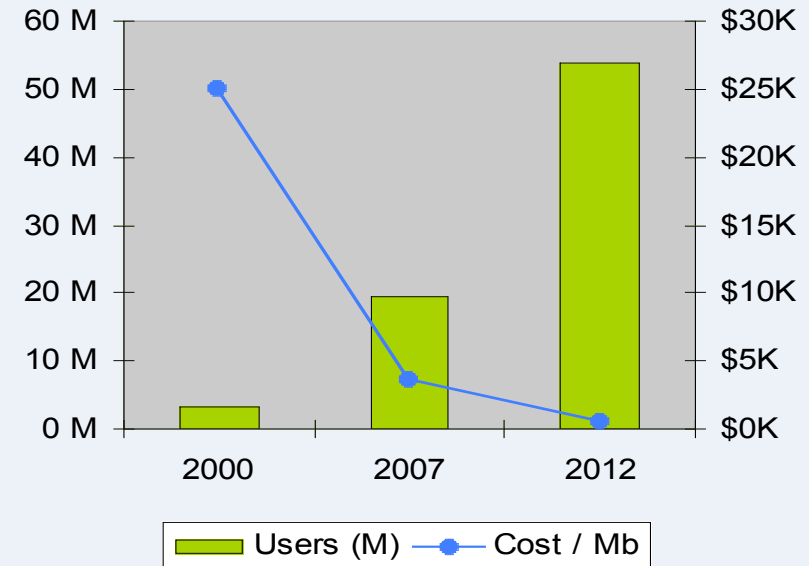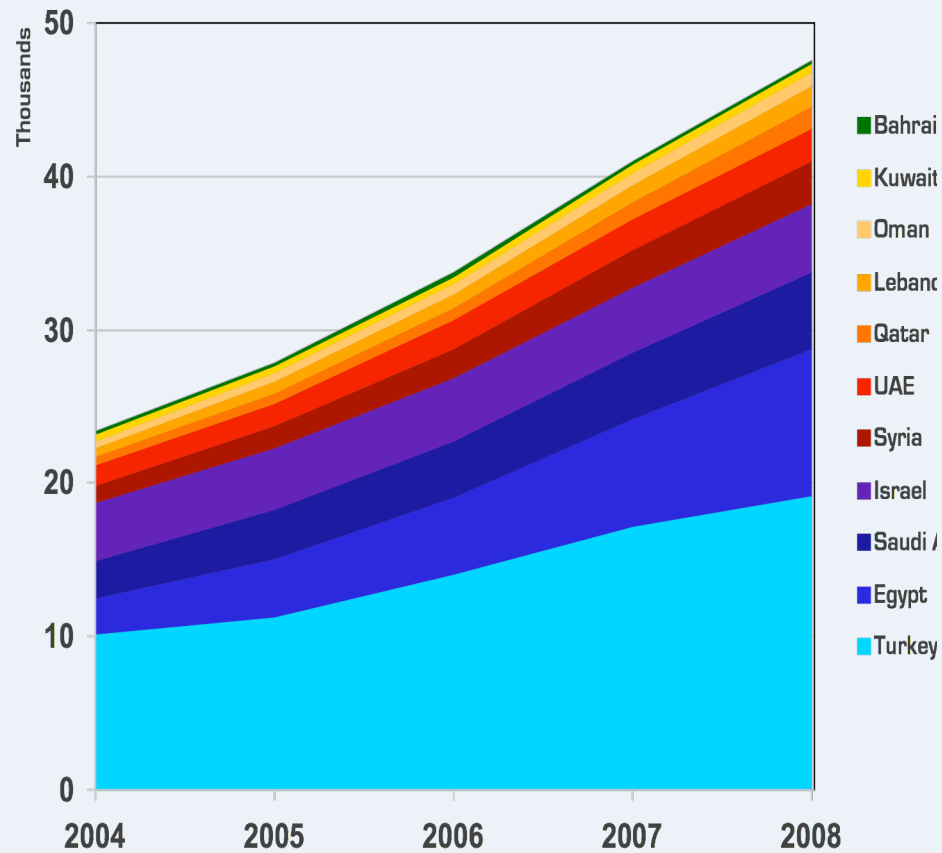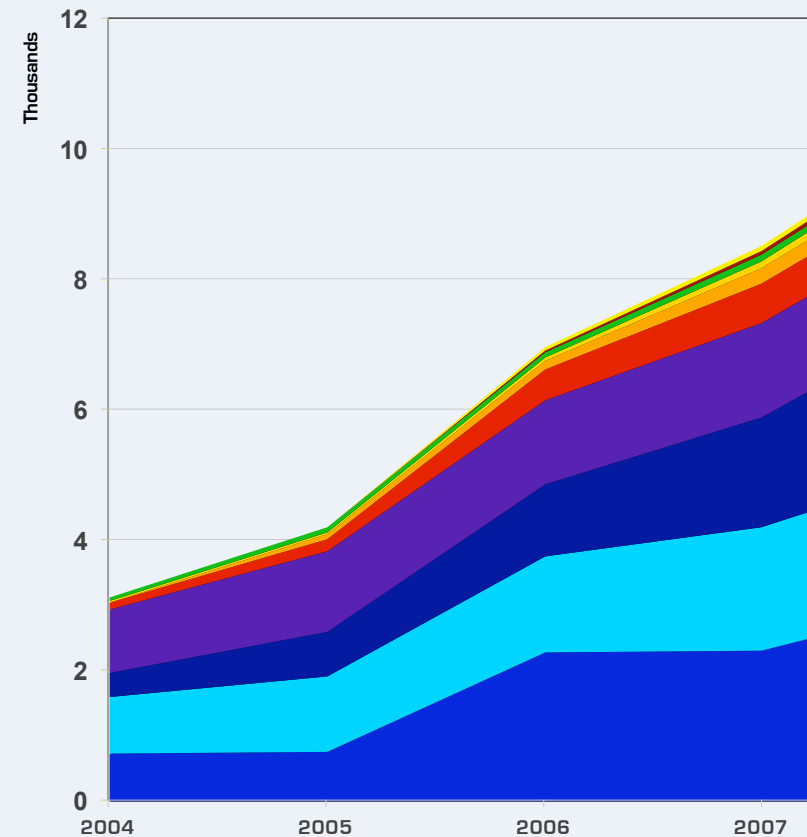

Source: InternetWorldStats.com, GG estimates

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Both residential and business use is growing fast

Middle East Internet Users

Legend: Bahrain, Kuwait, Oman, Lebanon, Qatar, UAE, Syria, Israel, Saudi Arabia, Egypt, Turkey

Middle East Broadband Subscribers

Source: CIA World Fact book

Developed Economies Enjoy the Lowest Internet Connectivity Prices

- Internet Service Providers (ISPs) might have to pay between 10 or 100 times more for data transport in regions that have poorly developed long-distance connections than ISPs in North America, Europe or Japan.

- Benefits of better connectivity:

  - Increase local traffic and content

  - Reduce the cost of purchasing international bandwidth

  - Positively impact the development of many sectors in the region
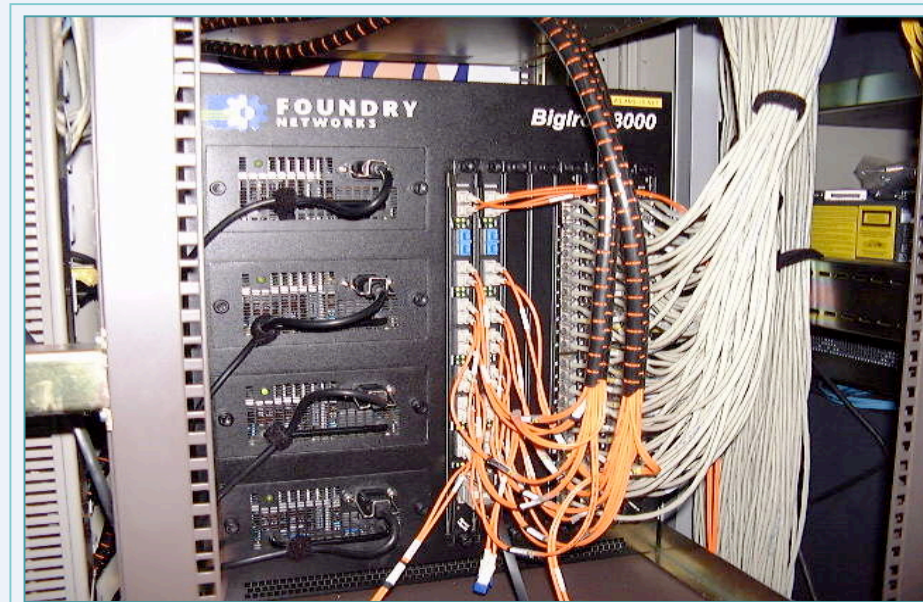
  - Raise the international profile of the region

Context

Internet Exchange is...

... a physical infrastructure that allows different
Internet Service Providers (ISPs) to exchange Internet
Traffic between their networks (autonomous systems)
by means of mutual peering agreements, which allows
traffic to be exchanged without cost. **Source:**
Wikipedia.com

The primary purpose of an IX is to allow networks to interconnect directly, via the exchange

Backbone A

Backbone B

Backbone C

Legend:

ISPs

IX Point
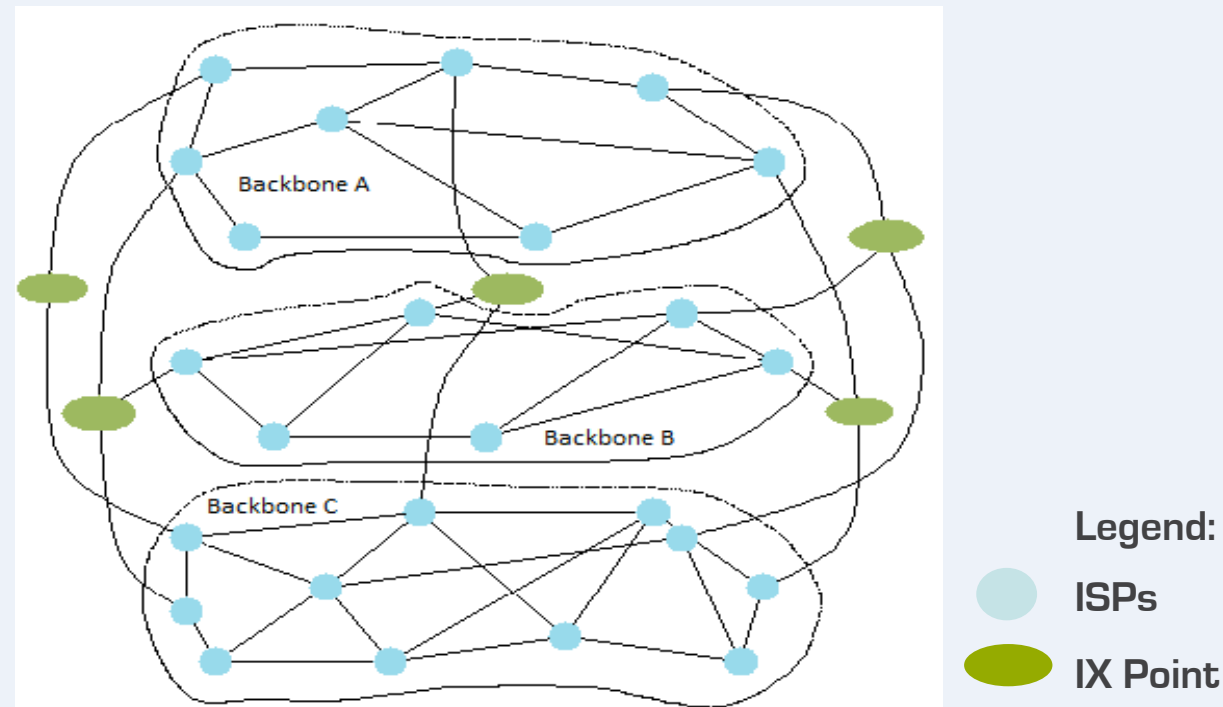
IXPs are responsible for internet infrastructure, gateways to worldwide internet and provide connection between local, the internet service providers and with the worldwide internet via their international gateways.

Source: Wikipedia.com

IX Benefits:
Reducing Costs and Speeding up Content Delivery

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What does an IX do?

- **Improves quality**

- **Saves money**

- **Adds value**

- **Creates new growth and**

- **Develops new opportunities such as:**

> "IXPs are the keystone of the entire Internet economy."
>
> **Cisco Systems**

- Voice
- Streaming Video/Audio
- Video-conferencing
- Telemedicine
- E-Banking

- On-demand entertainment
- E-Commerce
- E-Learning
- E-Government

http://gac.icann.org

Models

Models

- Today's successful IXs have different histories and structures, face different challenges, and operate under different economic, technical and legal circumstances.

- There is not a "right" model, but carrier neutral IXs have proven the most successful .

- The two models used are:
  - ❑ Private
  - ❑ Non-Profit

Before…

Non-Profit

- Most IXs in Europe grew from non-profit ventures, such as:

    – Research Organizations

    – Academic Institutions

    – Collaboration between ISPs

Private

- By comparison, in the US the majority of IXs are private, and also some private IXs have emerged in Europe.

Importance of Neutrality

- Potential conflicts of interest may arise if the ownership of the IX is in the hands of carriers, ISPs and co-location providers.

- A feature of many IXs is that they prohibit themselves from carrying out any activity that may compete with member/customer business activities.

- Whether commercial or not, IXs should be owned and managed neutrally

"Some carriers with excess space in their facilities used to allow customers to lease racks very cheaply, assuming they would buy circuits from the carrier. Instead, those customers started buying cheaper circuits from other carriers. Not liking this turn of events, carriers started prohibiting customers from bringing in 'outside' circuits. And so, enter 'carrier neutral' facilities".

SD-Member of the ISP colo list

Carrier Hotels:
Competition leading to better discounts on circuits

- Most of the larger IXPs have said that their success has been partly as a result of their neutrality.

- Carrier neutral customers' gain an open source of business opportunities with no obligations to the IXs for network services.

- There are many instances where the 'carrier neutral' status is violated, but this is because discrepancies on the definition.

- The important point to keep is that the ownership and management should remain neutral and to avoid monopolization.

Advantages of IXs/Carrier Neutrals in the Region

- ## Cost:

  - Traffic passing through an exchange is typically not billed by any party, whereas traffic to an ISP's upstream provider is.

- ## Latency:

  - The direct interconnection, often located in the same city as both networks, avoids the need for data to travel to other cities to get from one network to another, thus reducing latency.

- ## Bandwidth:

  - A connection to a local may allow ISPs to transfer data without limit, and without cost, vastly improving the bandwidth between customers of the two adjacent ISPs.

Reduce delays, improve performance

200-900 ms

200-900 ms

5-20 ms
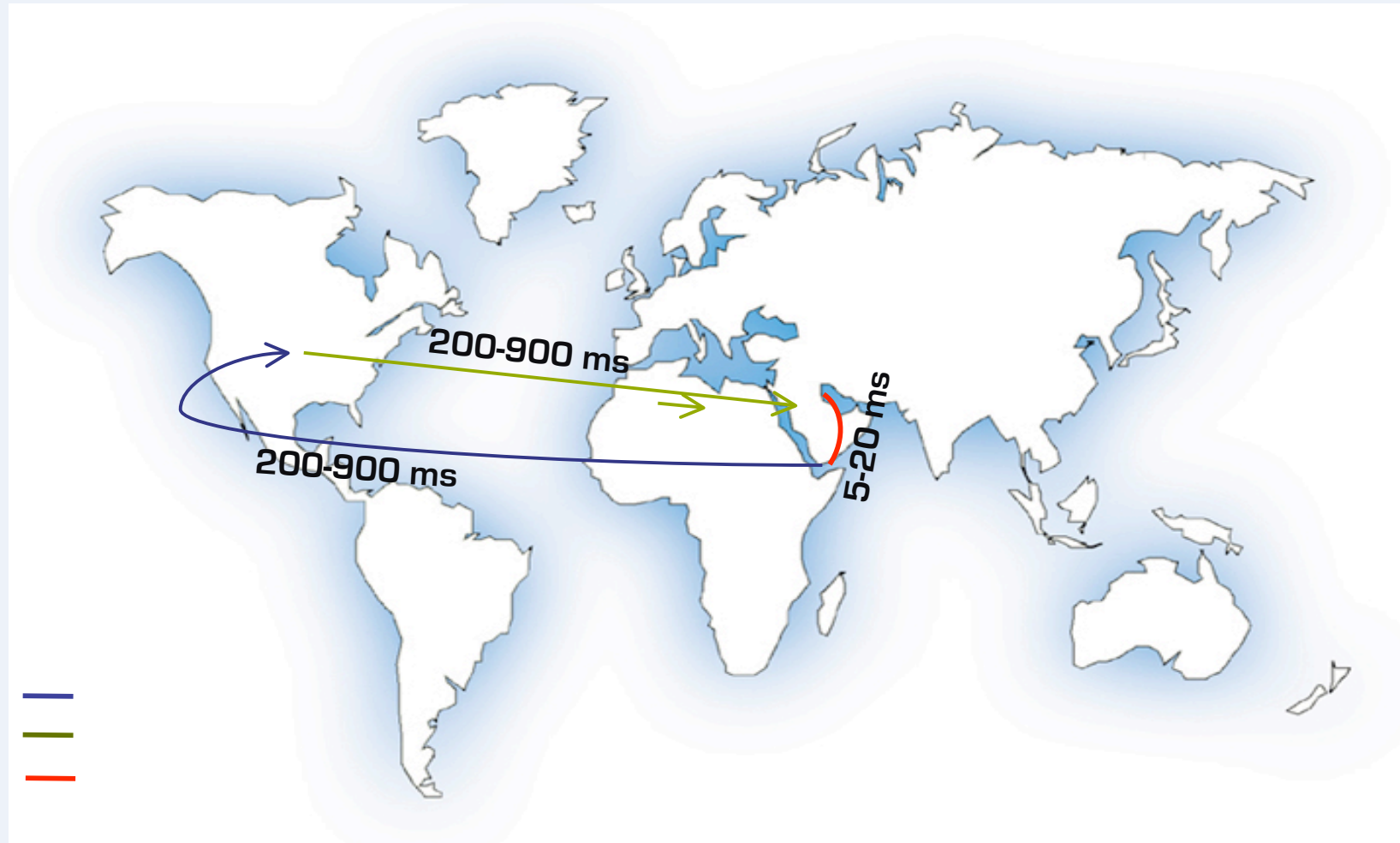
Example: Without an IX in the region sending an email from Yemen to Bahrain could represent going to the United States, back into Saudi Arabia and finally Bahrain.

Approximate Bandwidth prices in some Gulf Countries

		Zone 1	Zone 2	Zone 3
		1M	1M	1M
BATELCO	Jul-07	$ 3,906	$ 6,452	$ 8,617
Bahrain	May-07	$ 5,411	$ 8,939	$ 11,936
	Jun-05	$ 5,400	$ 9,000	$ 12,000
STC	Jul-07	$ 1,333		
Saudi Arabia	May-07	$ 10,133	$15,733	$ 19,467
	Jun-05	$ 12,700	$20,000	
OMANTEL	May-07	$ 13,636	$20,000	$ 21,818
Oman	Jun-05	$ 13,650	$20,020	$ 21,840
ETISLLAT	May-07	$ 7,851	$10,044	$ 15,450
UEA	Jun-05	$ 7,700	$ 9,800	$ 15,000
QTEL	Jun-05	$ 11,000	$18,000	$ 8,617
Qatar	May-07	$ 3,906	$ 6,452	$ 8,617
	Jun-05	$ 3,906	$ 6,452	$ 8,617

Other topics to consider when dealing with IXs

- **Ownership:** If one, or a sub-set of the interested parties have ownership of any of the physical assets that make up the IX.

  – There could be neutrality and other, potentially more serious, issues.

- **Management:** Sometimes IXs have no formal body, they are run and managed by general consensus between the parties involved.

  – There are issues that suggests that a 'free form' purely consensual based model does not scale.

- **Scope of activities:** Some IXs are limited to purely providing a switched infrastructure, while others offer extra technical and non technical services.

IXs in the Region

Internet Exchanges in the Region

Legend: IX (purple), Integrated DC/IX (purple/green)

The closest carrier – neutral IXs in the region are located in India, Egypt, Bahrain* and Oman*

Non Profits

Private

* Commissioning Q1 2008

Carrier Neutrals
In the Region

Who owns the IXs?
Terremark – Privately held

- PENN Capital Management Co., Inc.

- Ashford Capitol Management Inc.

- FMR Corporation (FIDELITY Management & Research Corp.)

- Barclays Global Investors UK Holdings Ltd

- Invesco PLC

- JANUS Capital Management, LLC

- Dimensional Fund Advisors INC

- Goldman Sachs Group INC

- KINGDON Capital Management LLC

- TIAA-CREF Capital Management, LLC

Who owns the IXs?
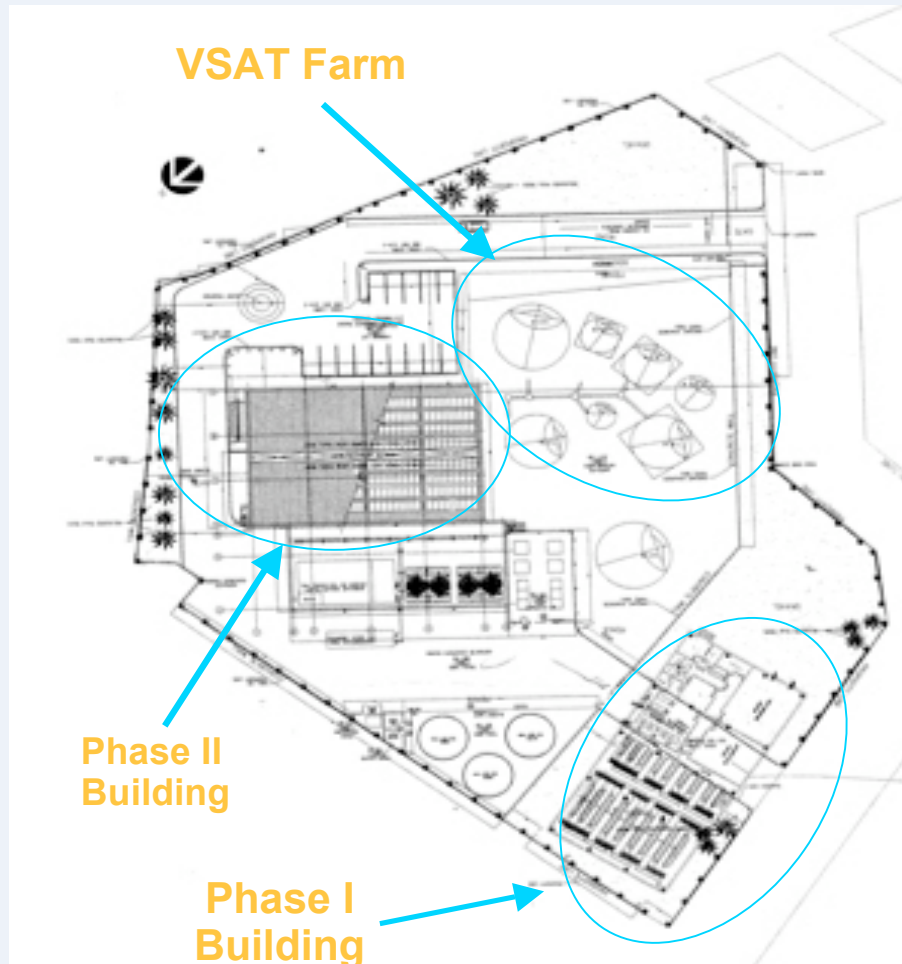# Equinix – Privately held

- **MORGAN STANLEY**

- **FMR CORPORATION (FIDELITY MANAGEMENT & RESEARCH CORP)**

- **LONE PINE CAPITAL, LLC**

- **JANUS CAPITAL MANAGEMENT, LLC**

- **WELLINGTON MANAGEMENT COMPANY, LLP**

- **TCS CAPITAL MANAGEMENT, LLC**

- **BAMCO INC.**

- **WELLS FARGO & COMPANY**

- **Barclays Global Investors UK Holdings Ltd**

- **American Century Companies, Inc.**

Gateway Gulf Datacenter Facility

VSAT Farm

Phase II Building

Phase I Building

Highlights

- **12,000 sq. m. facilities in each location**
- **World class capabilities**
  - Tier 1 Internet Exchange
  - Tier 4 Data Center
  - VSAT Farm
  - Hosting & managed services
- **Exceptional fiber connectivity**
  - International Submarine landing sites
  - Exclusive KSA fiber routes
- **Unmatched strategic location**
  - Central location within region
  - Favorable economic & regulatory climate
- **Bahrain Commissioning Q1 2008**
- **KSA, Oman Interim sites Q1 2008**

TOTAL CARRIER NEUTRALITY

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Integrated Suite of Offerings @ Gateway Gulf

2

Data Center

Offerings
 - Colocation
 - Cross-connects
 - Services

Primary customers
 - Enterprise
 - Small & medium business
 - Government & agencies

1

Internet Exchange

Offerings
 - Public peering
 - Private peering
 - Colocation
 - Bandwidth marketplace

Primary customers
 - Carriers
 - ISPs & CDNs
 - Web infrastructure

3

Satellite Farm

Offerings
 - Colocation
 - Cross-connects
 - Uplinks/downlinks
 - DBS

Primary customers
 - Media & broadcasting
 - Enterprise
 - Carriers

4

Managed Services

Offerings
 - Colocation
 - Cross-connects
 - Services

Primary customers
 - Enterprise
 - Small & medium business
 - Government & agencies

Thank You

Questions & Answers