Enhancing the Quality of IT Services in Higher Education Institutions

Dr. Ahmed Dabbagh
Manager, Services & Technology
01
Ankabut At a Glance
Ankabut vision

3.3 Knowledge-based and highly productive economy

Innovation, research, science and technology will form the pillars of a knowledge-based, highly productive and competitive economy, driven by entrepreneurs in a business-friendly environment where public and private sectors form effective partnerships.

4.0 First-rate Education

All Emiratis will have equal opportunity and access to first-rate education that allows them to develop into well-rounded individuals, enhance their educational attainment, and achieve their true potential, contributing positively to society.
UAE doesn’t need Technology Transfer,

UAE needs Knowledge Transfer

Dr. Eesa Bastaki, ex-CEO ICT-Fund
“Made in UAE”
ICTRF2011, May 15th 2011
What is ANKABUT?

Ankabut is the United Arab Emirates’ Advanced Research and Education Network (NREN). It offers educational and research networks connectivity to other education networks around the world.

Ankabut also co-operates on a national, GCC, regional and international arena representing the UAE in conferences, exhibitions and forums.
NRENs around the World

Africa
Sub-Saharan Africa (UbuntuNet)
Ghana
Kenya (KENET)
Malawi (MAREN)
South Africa (TENET)
Uganda (RENU)

East Asia & Pacific
Asia (APAN)
South & East Asia (TEIN2)
Australia (AARNET)
China (CERNET,CSTNET,NSFNET)
Fiji (USP-SUVA)
Hong Kong (HARNET)
Indonesia (ITB)
Japan (SINET, WIDE, JGN2)
Korea (KOREN, KREONET2)
Malaysia (MYREN)
New Zealand (KAREN)
Philippines (PREGINET)
Singapore (SingAREN)
Taiwan (TANet2, ASNet)
Thailand (UNINET, ThaiSARN)
Vietnam (VINAREN)

Europe & Central Asia
Europe (GEANT2)
Armenia (ARENA)
Austria (ACOnet)
Belgium (BELNET)
Croatia (CARNet)
Czech Rep. (CESNET)
Cyprus (CYNET)
Denmark (Forskningsnettet)
Estonia (EENet)
Finland (Frunet)
France (Renater)
Georgia (GRENA)
Germany (G-WIN)
Greece (GRNET)
Hungary (HUNGARNET)
Iceland (RHnet)
Ireland (HEAnet)
Italy (GARR)
Kazakhstan (KAZRENA)
Latvia (LATNET)
Lithuania (LITNET)
Luxembourg (RESTENA)
Malta (Univ. Malta)
Netherlands (SURFnet)
Norway (UNINETT)

Europe

Mid-East & N.Africa
U.A.E. (ANKABUT)
Algeria (ARN)
Egypt (EUN/ENSTINET)
Jordan (JUNET)
Lebanon (NCSR)
Morocco (MARWAN)
Palestinian Terr. (Pad12)
Syria (HIAST)
Tunisia (MRST)
Oman (OMREN)
Qatar (QFREN)

South Asia
India (ERNET)
Nepal (NREN)
Pakistan (PERN)
Sri Lanka (LEARN)
<table>
<thead>
<tr>
<th>Date</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>7-Aug-2006</td>
<td>ANKABUT formation MoU</td>
</tr>
<tr>
<td></td>
<td>MoU on Establishing a Consortium for UAE Research and Education Network</td>
</tr>
<tr>
<td></td>
<td>(ANKABUT) between KU, IAT, ZU, UAEU, HCT</td>
</tr>
<tr>
<td>3-Dec-2006</td>
<td>Internet2 and ANKABUT interconnect MoU</td>
</tr>
<tr>
<td></td>
<td>MoU between Internet2 and Etisalat University College</td>
</tr>
<tr>
<td>27-May-2007</td>
<td>Dante and ANKABUT interconnect MoU</td>
</tr>
<tr>
<td></td>
<td>MoU between DANTE and Etisalat University College</td>
</tr>
<tr>
<td>5-Apr-2009</td>
<td>Funding Agreement</td>
</tr>
<tr>
<td></td>
<td>Signed between ICT FUND and Khalifa University to fund the ANKABUT Project</td>
</tr>
<tr>
<td>5-Jul-2009</td>
<td>Contract</td>
</tr>
<tr>
<td></td>
<td>Signed between Etisalat and Khalifa University for building a new network</td>
</tr>
<tr>
<td></td>
<td>for Education and Research in UAE</td>
</tr>
</tbody>
</table>
- ICT fund funded the ANKABUT project for the initial five years of operation.
- During this time, KUSTAR manages ANKABUT in partnership with ETISALAT.

- Beyond the 5 years, ANKABUT will be spun-off as an independent organization with ownership stakes held by its users.
Connected: 42 campuses

In progress: 16 campuses
Ankabut at A Glance

Highlights...

• Has become a Local Internet Registry (IPV4, IPV6)

• Increased international bandwidth to a **155 mbps** leased line with Internet2.

• Placed an **Internet1** link in the Sharjah Router

• Has connected/connecting **56** academic **1Gbps** Access links.

• Has created **DNS, NTP, Email and Web hosting, Video.Conf, Grid-Computing, High Performance Computing, Virtual Classroom services.**
Eligibility to Join Ankabut

1. All Higher Education Institutions
2. Other research and development institutions
3. Schools
4. Zoos
5. Museums
6. Public libraries
7. Health Services and Centers
8. Other organizations may be provided with a connection with the express agreement of Ankabut & eligible sponsor
Ankabut was selected by TRA as one of the three best ICT projects in UAE during 2012:

- Ankabut
- EmiratesID
- Sharjah e-Gov
Ankabut was successfully launched the unique of its kind Library Consortium for Academic & Research in UAE
The Benchmark
- Network
- Services & Budget
Bandwidth in use across Europe’s Education Sector

- **UAE Universities**

- 700 Terabytes
03

- Ankabut Network
  - IP Registry
03.1 Ankabut Network Topology
Network Utilization - International

![Network Utilization Chart]

**From 06/Jan/2013 09:28:53 To 06/Feb/2013 09:28:53**

- **IN-HIGH**
  - Current: 61.04 k
  - Average: 1.99 M
  - Maximum: 19.86 M

- **IN-MEAN**
  - Current: 197.26 k
  - Average: 5.97 M
  - Maximum: 146.37 M

- **OUT-HIGH**
  - Current: 898.98 k
  - Average: 1.92 M
  - Maximum: 19.00 M

- **OUT-MEAN**
  - Current: 1.21 M
  - Average: 6.38 M
  - Maximum: 84.94 M
State-of-the-art Network for UAE
### Local Internet Registry

Ankabut Provides Data Network Addressing to the Community

<table>
<thead>
<tr>
<th>Entity</th>
<th>IPv4</th>
<th>IPv6</th>
<th>AS Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ankabut</td>
<td>109.205.24.0/21</td>
<td>2a00:1b00::/32</td>
<td>AS47862</td>
</tr>
<tr>
<td></td>
<td>176.74.48.0/21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>UAE University</td>
<td>178.250.248.0/22</td>
<td>2a02:1718::/32</td>
<td>AS51182</td>
</tr>
<tr>
<td></td>
<td>194.69.1.0/24</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>178.250.248.0/23</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>178.250.250.0/23</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Higher Colleges of Technology (HCT)</td>
<td>31.29.64.0/19</td>
<td></td>
<td>AS56479</td>
</tr>
<tr>
<td>Paris-Sorbonne University Abu Dhabi</td>
<td>91.229.64.0/23</td>
<td>2001:67c:2348::/48</td>
<td>AS39031</td>
</tr>
<tr>
<td>New York University Abu Dhabi (NYUAD)</td>
<td>91.230.41.0/24</td>
<td>2001:67c:2350::/48</td>
<td>AS50811</td>
</tr>
<tr>
<td>Abu Dhabi University (ADU)</td>
<td>91.231.11.0/24</td>
<td>2001:67c:23e8::/48</td>
<td>AS57143</td>
</tr>
<tr>
<td>Zayed University (ZU)</td>
<td>193.33.102.0/23</td>
<td>2001:67c:23f0::/48</td>
<td>AS57163</td>
</tr>
<tr>
<td>American University of Sharjah (AUS)</td>
<td>193.33.172.0/23</td>
<td>2001:67c:2408::/48</td>
<td>AS57171</td>
</tr>
</tbody>
</table>

**IPv4 Exhaustion Counter, Ref:** [http://inetcore.com/project/ipv4ec/index_en.htm](http://inetcore.com/project/ipv4ec/index_en.htm)
Routed Solution for Large Institutions

The Networking Solution

Implemented
- This architecture been deployed at UAE University and Khalifa University

Requirements
- University router should hold 30-50k routes. Presently, 13k are sent from Internet2.
- University required to own their own AS Number, IPv4 and IPv6 address space.

Benefits
- Allows multiple networks to be easily connected
- Simplification of IP address space
- Redundant routes to Internet2 destinations
Small Institutions: For Future Work

The Networking Solution

Simple for an institution to administer.

Requires no extra-hardware.

Can be used with internet to offer redundancy.

Solution become available to small institutes.

Internet contract remains with present ISP.

IP addressing needs to be altered.
Institute of Applied Technology - Topology

VPN Connectivity

IAT Inter campus VPN layout

-60% off bill
Network Utilization - UAE

**AUH-HCT-CENTRAL - Gi0/16 - Link Designation AUC-NIR-A2W-HCT(CENT SEVS) A**

- **IN-HIGH**
  - Current: 2.16 M
  - Average: 5.89 M
  - Maximum: 35.73 M

- **IN-MEAN**
  - Current: 12.17 M
  - Average: 27.40 M
  - Maximum: 203.01 M

- **OUT-HIGH**
  - Current: 13.01 M
  - Average: 26.73 M
  - Maximum: 118.54 M

- **OUT-MEAN**
  - Current: 62.58 M
  - Average: 133.85 M
  - Maximum: 693.61 M

**AUH-LAT-MBZ - Gi0/16 - ANKABUT/AUC-MUE/ LAT AUH MBZ 1GB ETH 01 Connected to**

- **IN-HIGH**
  - Current: 18.33 M
  - Average: 7.37 M
  - Maximum: 54.63 M

- **IN-MEAN**
  - Current: 27.72 M
  - Average: 34.56 M
  - Maximum: 173.63 M

- **OUT-HIGH**
  - Current: 15.11 M
  - Average: 11.66 M
  - Maximum: 61.07 M

- **OUT-MEAN**
  - Current: 29.39 M
  - Average: 26.42 M
  - Maximum: 119.33 M
2012 Services Status
2012 Services:
Projects Status

• The UAE Educational Disaster Recovery Solution
  • Meeting w/ CIOs and founded a Task-Force Team
  • Started implementing a Pilot project with EPFL_RAK

• The UAE e-Education Platform
  • Preparing a national strategy to adopt Ankabut as the main ESP for the Ministry of Education “Smart Learning”

• The UAE Unified Communications between Higher Education Institutions
  • “Multi-Party Video/Audio Conferencing” + Calendaring over the network is ready as Phase 1 of Unified Comm.

• The UAE Consortium of Library
  • A task-force team was founded. e-FADA bylaw reviewed. The consortium will be created soon.
Services:
Ongoing Projects (2)

• Virtual Classroom
  • Alcatel-Lucent hosted a smart solution of Virtual Classroom as a Demo at Ankabut premises.

• High Performance Computing
  • Intel offered 4 nodes latest technology HPC to Ankabut. Training sessions will be conducted next year

• AE_Ankabut_01 Grid Computing
  • Production site is under development. Good progress. Grid schools will be conducted as well

• Ankabut Certification Authority
  • Ankabut is Registration Authority from INFN and MAGRID. Final Accreditation step to IGTF is ongoing
04.1

UAE Offsite Disaster Recovery
- UAE universities have no backup strategy of student information.
- UAE universities show interest on investing in DR & Business Continuity, BUT not ALONE (high price of lease lines)
- CIO’s asked to have a national solution over Ankabut Cloud
- A task-force team decided to go for a pilot with EPFL, AUS, UAEU and KUSTAR and to share the result with members (fully supported by Ankabut)
Remote branch office backup

Ankabut Data Centre

Optional Shared Subscription
Disaster Recovery Servers & Storage

Encrypted/compressed data
04.2
Ankabut e-Education
1. Connect and provide services to MOE Training Centers (3 over UAE)

2. To support ICTFund Initiative to connect the 21 Virtual Labs for MOE

3. To connect with ADEC school network

4. To be the strategic partner of Sheikh Mohamed Bin Rashed Initiative “Smart Learning”

5. Negotiate with Learning Software providers National license prices

6. Provide VLMS to Institutions (4 Moodle sites)