Providing Education & Research services to UAE Institutions at no cost.

Dr. Ahmed Dabbagh
Director, Services & Strategy

UAE Advanced Network for Research & Education
International Conference on Sharing Knowledge in the Mediterranean (8)
Rabat, Morocco, 10th May 2013
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, CEO ICT-Fund “Made in UAE” ICTRLF2011, 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, NSFCNET)
- 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 (Funct)
- France (Renater)
- Georgia (GRENA)
- Germany (G-WIN)
- Greece (GRNET)
- Hungary (HUNGARNET)
- Iceland (RHNnet)
- Ireland (HEAnet)
- Italy (GARR)
- Kazakhstan (KAZRENA)
- Latvia (LATNET)
- Lithuania (LITNET)
- Luxembourg (RESTENA)
- Malta (Univ. Malta)
- Netherlands (SURFnet)
- Norway (UNINET)
- Poland (PIONIER)
- Portugal (RCTS2)
- Romania (RoEduNet)
- Russia (RNet, RUNNET)
- Slovakia (SANET)
- Slovenia (ARNES)
- Spain (RedIRIS)
- Sweden (SUNET)
- Switzerland (SWITCH)
- United Kingdom (JANET)
- Tajikistan (TARENA)
- Turkey (ULAKBIM)
- Uzbekistan (UZSCI)

## Americas
- Latin America (redCLARA)
- Argentina (RETINA)
- Bolivia (ADSIB)
- Brazil (RNP2/ANSP)
- Canada (CA*net)
- Chile (REUNA)
- Colombia (RENATA)
- Costa Rica (CR2Net)
- Ecuador (CEDIA)
- El Salvador (RAICES)
- Guatemala (RAGIE)
- Honduras (UNITEC)
- Mexico (Red-CUDI)
- Nicaragua (RENA)
- Panama (RedCyt)
- Paraguay (ARANDU)
- Peru (RAAP)
- United States (Internet2)
- Uruguay (RAU2)
- Venezuela (REACCIUN2)

## Mid-East & N.Africa
- U.A.E. (ANKABUT)
  - Algeria (ARN)
  - Egypt (EUN/ENSTINET)
  - Jordan (JUNET)
  - Lebanon (NCSR)
  - Morocco (MARWAN)
  - Palestinian Terr. (PadI2)
  - 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>
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</table>
| 7-Aug-2006 | ANKABUT formation MoU
   MoU on Establishing a Consortium for UAE Research and Education Network (ANKABUT) between KU, IAT, ZU, UAEU, HCT |
| 3-Dec-2006 | Internet2 and ANKABUT interconnect MoU
   MoU between Internet2 and Etisalat University College |
| 27-May-2007| Dante and ANKABUT interconnect MoU
   MoU between DANTE and Etisalat University College |
| 5-Apr-2009 | Funding Agreement
   Signed between ICT FUND and Khalifa University to fund the ANKABUT Project |
| 5-Jul-2009 | Contract
   Signed between Etisalat and Khalifa University for building a new network for Education and Research in UAE |
Current funding

- ICT fund funded the ANKABUT project for the initial five years of operation
- During this time, KUSTAR manages ANKABUT in partnership with ETISALAT

Future funding

- Beyond the 5 years, ANKABUT will be spun-off as an independent organization with ownership stakes held by its users.
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
Bandwidth in use across Europe’s Education Sector

- UAE Universities
- 700 Terabytes
• Ankabut Network
  – IP Registry
### 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>
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<tr>
<td></td>
<td>176.74.48.0/21</td>
<td></td>
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<tr>
<td>UAE University</td>
<td>178.250.248.0/22</td>
<td>2a02:1718::/32</td>
<td>AS51182</td>
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<tr>
<td></td>
<td>194.69.1.0/24</td>
<td></td>
<td>AS51182</td>
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<tr>
<td></td>
<td>178.250.248.0/23</td>
<td></td>
<td>AS51182</td>
</tr>
<tr>
<td></td>
<td>178.250.250.0/23</td>
<td></td>
<td>AS51182</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>
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<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>
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<tr>
<td>American University of Sharjah (AUS)</td>
<td>193.33.172.0/23</td>
<td>2001:67c:2408::/48</td>
<td>AS57171</td>
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</table>

IPv4 Exhaustion Counter, Ref: [http://inetcore.com/project/ipv4ec/index_en.htm](http://inetcore.com/project/ipv4ec/index_en.htm)
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

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)
04.2

Video-Conferencing Over the Network
Video Conferencing

Highlights...

- Is implementing a network wide Video Conf. MCU
- Fully Interoperable
- Calendar & Scheduler
Unified communications

On Demand
Virtual Rooms
Charged by the hour

Point to Point
Multi to Multi Point
Legacy Connectivity
Web
Mobile & Tablets
Conference Rooms
Extended Voice
Extended Video
Extended Mobile

Microsoft

Polycom

Alcatel-Lucent

OmniTouch

IBM

UC In-a-Box

Ankabut

Ankabut Partners

Government

Int'l Providers

LifeSize

Cisco

Avaya

Microsoft

IBM
We don’t start from scratch

- Governing Board
- Library Manager
- Policies
- Procedures
- System Librarian
- Fund
- Finance
Survey on Library Budget May/2012

Only 10 Institutions answered to the Survey
## HPC Users’ Manual

### Institution | # Users | Applications
--- | --- | ---
KUSTAR | 2 | Aerospace, Nuclear
Masdar | 2 | Computation, Env.
UAEU | 1 | Biology

### Introduction

ANKABUT High Performance Computing (HPC) provides the following resources to support research and education activities:

1. **Supercomputing Facility**:
   - **Architecture**: Intel Xeon Phi, Interlagos, and Haswell.
   - **Performance**:
     - **CPU**: 2.3 GHz, 64-core processors.
     - **Memory**: 32 GB DDR3, 64 GB DDR4.
     - **Storage**: 9.6 TB HDD, 1.8 TB SSD.
   - **Networking**: 10 Gbps Ethernet, InfiniBand 100 Gbps.

2. **Software Environment**:
   - **Operating System**: Red Hat Enterprise Linux.
   - **Programming Languages**: Fortran, C, C++, Python, R.

3. **Support Services**:
   - **Consulting**: 24/7 support for software installation and usage.
   - **Training**: Regular workshops and seminars on HPC applications.

### Manual Objective

The objective of this manual is to guide users on how to use the ANKABUT High Performance Computing (HPC) platform effectively. It covers the following topics:

1. **Installation and Configuration**: Steps to install and configure the HPC environment.
2. **Usage**: Guidelines on how to submit and manage jobs on the HPC system.
3. **Support Services**: Details on obtaining help and training resources.

### Platform Life Cycle

The life cycle of a job on the HPC platform is as follows:

1. **Submission**: Users submit a job script to the HPC scheduler.
2. **Queueing**: The job is queued according to its priority and availability.
3. **Submission**: The job is submitted to the scheduler when resources become available.
4. **Execution**: The job is executed on the HPC system.
5. **Completion**: The job is completed and the results are generated.
6. **Monitoring**: Users can monitor the progress of their jobs through a web interface.

### Web Interface Access

Use the following URL to access the web interface:

https://hpc.ankabut.ae

### Conclusion

ANKABUT High Performance Computing (HPC) is a valuable resource for researchers and educators. Its high-performance computing capabilities and user-friendly interface make it an ideal platform for conducting complex simulations and data analysis.
UAE Grid Computing

04.5
ANKABUT has participated in the Joint EUMEDGRID-Support/EPIKH School for Computing Grids (seasons).

Ankabut built up a seed system for the National Grid initiative in the UAE. Ankabut can dispatch jobs on to the world’s grid system using the gLite middleware.

The Grid Site in Abu Dhabi is the first grid site ever installed in the GCC as part of the EUMEDGRID-Support e-Infrastructure.

Ankabut is seeking Grid partners to grow the distributed computing environment within the UAE.
Ankabut is on the World Grid Map
Helped Ayaadi “Etisalat Fund for Social Responsibility” to negotiate eBooks and obtained excellent price (4 times less)
UAE Open Source Software Research & Development Center (OSSRDC)

Dataverse used by Researchers to publish, share, reference, extract and analyze research data.

Zayed University Students to use Ankabut Network for Open Source Project
1. Our Services Roadmap will be linked to **OUR MEMBER NEEDS**

2. Work collaboratively with members

3. **Do projects together**:
   - 1. FID
   - 2. HPC
   - 3. EduRoam
   - 4. Etc...
<table>
<thead>
<tr>
<th>Member benefits</th>
<th>Features</th>
<th>2012</th>
<th>2013</th>
<th>Description</th>
<th>Stakeholders</th>
</tr>
</thead>
<tbody>
<tr>
<td>Security &amp; Authentication Services</td>
<td>Federated Identity</td>
<td>✔️</td>
<td>✔️</td>
<td>Management and use of identity information across organization boundaries. Allows organizations to participate in inter organization authentication and authorization.</td>
<td>Decision Makers CIO IT Department Researchers Faculty Students</td>
</tr>
<tr>
<td></td>
<td>EduRoam</td>
<td>✔️</td>
<td>✔️</td>
<td>Eduroam (education roaming) is the secure, world-wide roaming access service developed for the international research and education community. It allows students, researchers and staff from participating institutions to obtain Internet connectivity across campus and when visiting other participating institutions by simply opening their laptop.</td>
<td>Decision Makers CIO IT Department Researchers Faculty Students</td>
</tr>
<tr>
<td>Communications Services</td>
<td>Unified Communications</td>
<td>✔️</td>
<td>✔️</td>
<td>Using communication tools connected to Institutions Identity Management for smooth communication and exchange of information.</td>
<td>Decision Makers CIO IT Department Researchers Faculty Students</td>
</tr>
<tr>
<td></td>
<td>Videoconferencing</td>
<td>✔️</td>
<td>✔️</td>
<td>Inter-Operability between different Institutions video systems and Ankabut by connecting to a Multi-Point Control Unit.</td>
<td>Decision Makers CIO IT Department Researchers Faculty Students</td>
</tr>
</tbody>
</table>
## Ankabut Services Roadmap for 2013

<table>
<thead>
<tr>
<th>Member benefits</th>
<th>Features</th>
<th>2012</th>
<th>2013</th>
<th>Description</th>
<th>Stakeholders</th>
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</thead>
<tbody>
<tr>
<td><strong>E-Science Services</strong></td>
<td></td>
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<td></td>
<td>Create a trust interface to connect all High Performance Computing in UAE Institutions to be used for shared computing resources in research</td>
<td>IT Department Researchers</td>
</tr>
<tr>
<td><strong>High Performance Computing</strong></td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>Create a trust interface to connect all High Performance Computing in UAE Institutions to be used for shared computing resources in research</td>
<td>IT Department Researchers</td>
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<tr>
<td><strong>Software &amp; Cloud Services</strong></td>
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<tr>
<td><strong>Inter-Library services (eFADA)</strong></td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>Create UAE Repositories. Manage International subscriptions fees. Help the Consortium to build one centralized Database for hard/soft books to all members</td>
<td>Decision Makers CIO IT Department Researchers Faculty Students</td>
</tr>
<tr>
<td><strong>Offsite Disaster Recovery</strong></td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>Education Institutions could have their host/warm/cold backup sites managed by Ankabut as a centralized service</td>
<td>Decision Makers CIO IT Department</td>
</tr>
<tr>
<td><strong>Virtual Desktop Infrastructure</strong></td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>Educational Institutions could have their PC desktops as virtual machines deployed and managed by Ankabut.</td>
<td>Decision Makers CIO IT Department Researchers Faculty Students</td>
</tr>
<tr>
<td><strong>Hosting &amp; Housing and Co-location</strong></td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>Educational Institutions applications can be hosted and managed by Ankabut, like websites, dns, emails, mailing list, etc..... Housing educational servers and application.</td>
<td>CIO IT Department Researchers Faculty Students</td>
</tr>
</tbody>
</table>
**Project Plan**

**UAE ADVANCED NETWORK FOR EDUCATION & RESEARCH**

Ankabut Services Roadmap 2013: version 1.0  
Author : Dr. Ahmed Dabbagh  
Date : January 27th 2013

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<tbody>
<tr>
<td>1</td>
<td>Ankabut Access Management Federation initiation</td>
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<td>2</td>
<td>FID Service Catalog</td>
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<td>3</td>
<td>Develop the Concept of Ankabut Pilot Project</td>
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<td>4</td>
<td>Implement the Pilot Project</td>
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<tr>
<td>5</td>
<td>Market the concept for larger number of Idps</td>
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<td>6</td>
<td>Show progress at Sept Ankabut Users’ Meeting</td>
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<tr>
<td>7</td>
<td>Explore new members to join (not more than 7)</td>
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<td>8</td>
<td>Work on federation of non web-based applications</td>
<td></td>
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</table>

**Unified Communications & VideoConferencing**

- eFADA
- FID

**EduRoam**

- DR/BC
- HPC
- VDI

**Co-Location & Hosting**
Ankabut Data Center is implemented with the highest Network requirements needed to support:

1. IPV6
2. Multicast
3. Disaster Recovery, Business Continuity, Hosting, Housing
4. Virtualization
5. Sharing, Provisioning, Billing,…

The Data Center target date for operation is: 

May 15th 2013
ANCHOR

Ankabut National Cloud & Hypercomputing ORganization (ANCHOR)

UAE Based Universities and Colleges

High Performance Computing Center
- Equipment
- Staffing
- Knowledge
- Facility
- Training
- Software
- Applications

Private Cloud

Network Operations Center

UC
Office Apps
Software Tools
Collabo. Apps

Technopark
DSO
Mandoor IST
UAEU

Other NRENs

Other International Universities

Rochester Institute of Technology - USA

Incubators & Startups

ANCHOR HQ

UAE Knowledge HUB
Highlights:

1- MoU signed between Ankabut & I2

2- To have UAE as the Knowledge Hub for the region

3- To be very attractive for the neighbored countries to connect internationally
UAE Knowledge Hub for International Connection

Ankabut @ UAE
1xSTM-1

Ankabut Knowledge Hub
1xSTM-4

Ankabut @ NY Mainland

ASREN
Arab States Research and Education Network

Arab R&E communities
Thank You