

GRID TALK....



...by Vijay Sahota

Definition...

“Grid computing is applying the resources of many computers in a network to a single problem at the same time - usually to a scientific or technical problem that requires a great number of computer processing cycles or access to large amounts of data.”

A well-known example of grid computing in the public domain is the ongoing SETI(Search for Extraterrestrial Intelligence) @Home project in which thousands of people are sharing the unused processor cycles of their PCs in the vast search for signs of "rational" signals from outer space.

-According to John Patrick, IBM's vice-president for Internet strategies, "the next big thing will be grid computing."

Outline...

- Introduction to Grid Computing
 - The Need for Grids
 - Concepts
 - Examples of real life use
 - Current status
 - Future plans for Grid computing at Middlesex and Grids in general.
-

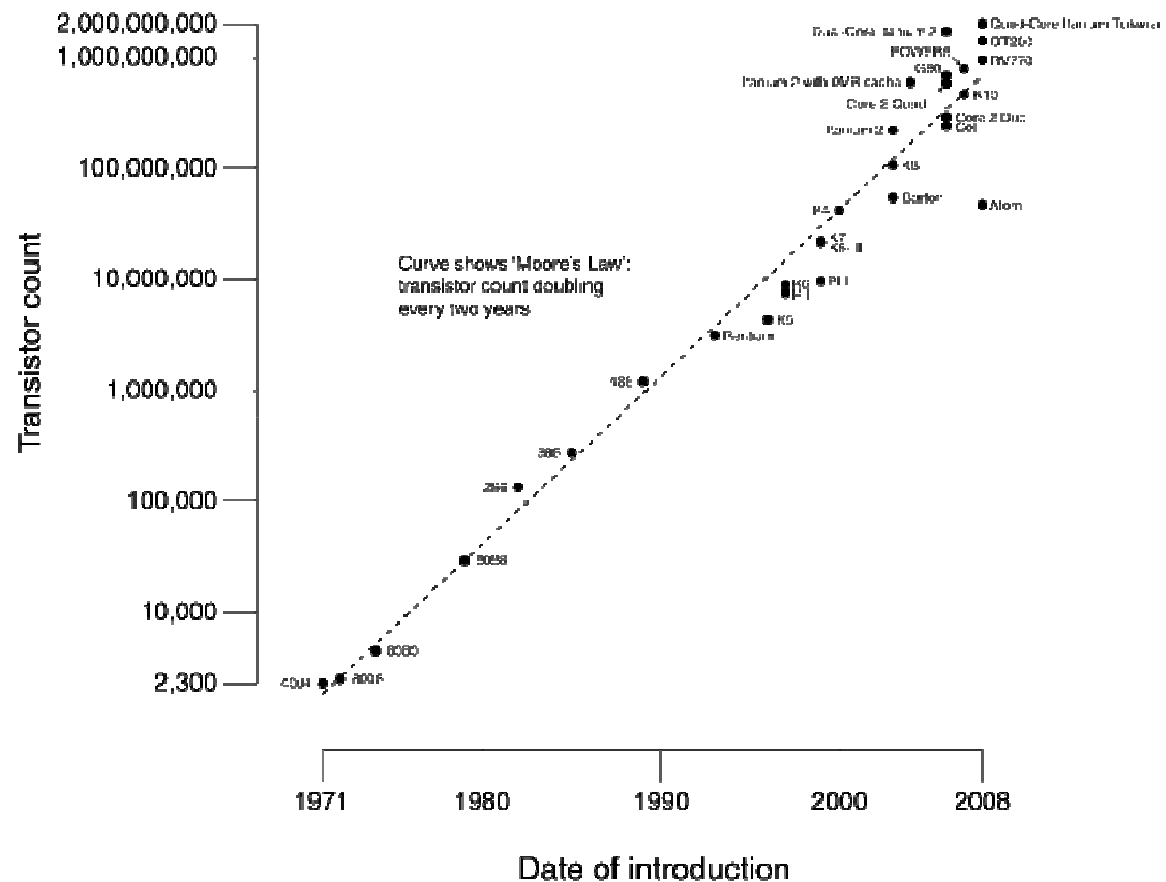
Why...

What are computers ?

What are they used for?

Simulations can run for many years!!

CPU Transistor Counts 1971-2008 & Moore's Law



Why not build/use a super computer...

AS OF JUNE 2008, IBM ROADRUNNER IS THE FASTEST...

-12,960 IBM cell processors & 6,480 Opteron CPUs....

-103.6 TB (103,600 GB) of Memory...

-6,000 sq ft (0.5Km x 0.5Km)

-With a Peak of 1.71 petaflops

-Costing \$133 Million.

-Using **2.3MW** of energy!

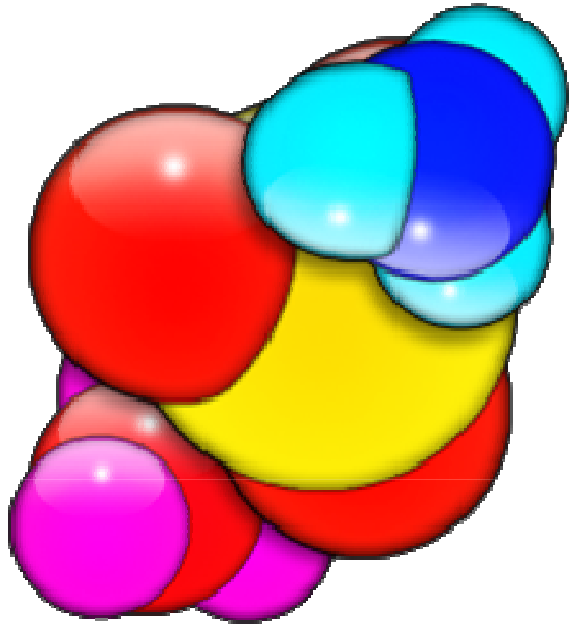


Clustering...

- Basically a collection of cheap... standard computers networked together to perform a common task.
- There are basically 2 kind of computing....
- HPC & HTC!
- Respectively one mainly aims to solve problems as quickly as possible while the other aims to process as much data as possible.
- The latter being more relative to grid computing.



Bio HTC examples...



BLAST...
Basic Local Alignment Search Tool

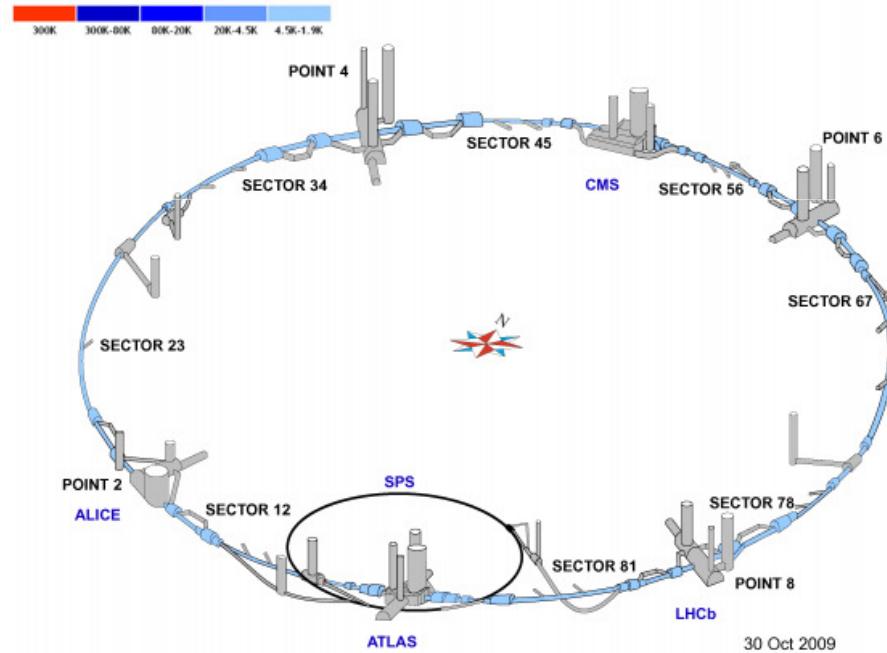
Folding@Home...
Similar to SETI but with protein folding

```
CTCCGGACAAATCGATGGCTTTTCG  
AATCCGTCGTTTTTTATGCCCTTTA  
AGGAGAAGCTATGCGTGATGCCCGT  
ATTCGCGTCCATGATCCGGCGCCG  
ATCGCTCCACATCAACAAACTAT  
GGTAAGAATGAGGCAATTGTATAG  
GCAGATGTGCCCGAGATCGGGTGG  
CTATAAACGATCTAACCGTTGGG  
GAACAGATGTAGCTCACCATACCT  
CGTGGAGAGGTAGCAACCTGCGC  
AAAGAGTGTAAAGCATCGCCCGAT  
GCGTAGTTATGCTCAAAGGGGAGG  
GTGTGAGTAAAGCTTAAAGACGCA  
TAAGCTTGAGATCAATAGTTAATT  
CGCTGACGCCCATAGGCGAGGGG  
ACGCCTGAGCGAATCTAATGGATG  
ATTGCTAGGGCTGGGATTCACTTC  
ATCGTTTTATCCACCCAAAGCGAA
```

Grids, Grids, Grids.....Issues!

However Grids were created by the Physic dept who quiet often had to sieve through and process PBytes of data (1000 TB or 1mill GB).

- CERN a 27 Km particle accelerator.
- Designed to bash atoms to prove theoretical sub atomic.
- TEN YEARS IN THE MAKING!!!



Issues... The List!

It is easier said than done, just couple a few computers into clusters and then make them talk to each other via the internet...NO!

- How to store and distribute large amounts of **data**
 - How to efficiently use the available **CPUs**
 - How to find what **services** are available
 - How to make this potential **Hackers** WMD Secure
 - How to make this environment **reliable**
 - Need a standard to **communicate** with each other
-

Data Storage and Processing...

There are mainly three things you need to do with data up/download it, store it to a standard and search/process the information.

The first two a standard format and uploading/ downloading has been more or less agreed on, and the favourite has been towards **Grid FTP**.

The third is an active field of research and one of the more famous names to be known are **Data Mining** and **semantics**.

*“**Data mining** is the process of **extracting patterns** from data. Data mining is becoming an increasingly important tool to transform these data into information. It is commonly used in a wide range of profiling practices, such as marketing, surveillance, fraud detection and scientific discovery.”*

...wiki



Condor
High Throughput Computing

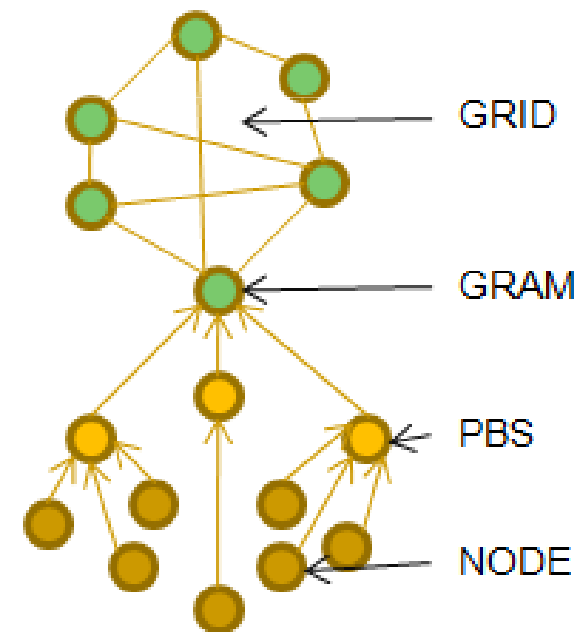


CPU cycle scavenging...

Just to get you familiar with this concept, basically systems such as **Condor & PBS Torque**, there exists a master computer that monitors all the computers under its sub-domain.

This however **is not a grid** as it doesn't allow use over the internet, or communicate with others.

GRAM is an interface of the **Globus project** that enable users to locate, submit, monitor and cancel remote jobs on Grid-based compute resources. GRAM enables remote execution management in contexts for which reliable operation, stateful monitoring, credential management, and **file staging** are important. GRAM is not a job scheduler. Rather, it provides a single protocol for communicating with different batch/cluster job schedulers.



Services and reliability...

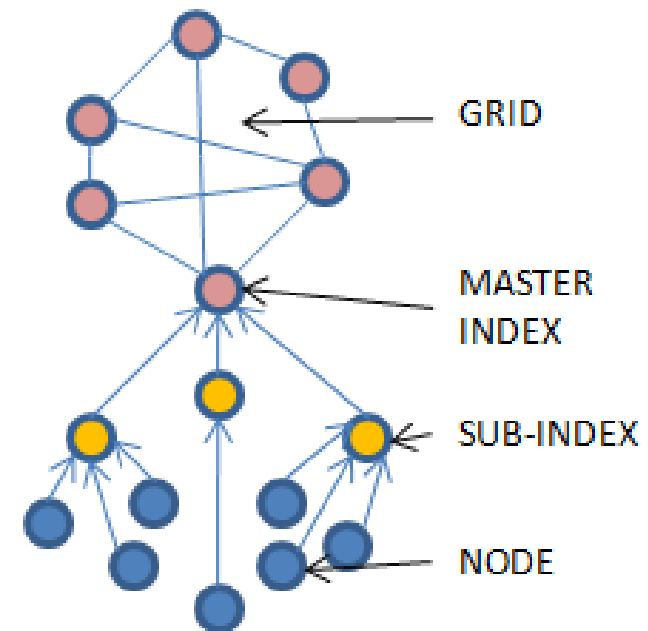


These two cases go hand in hand given that a reliable service depends on accurate information and knowing what is out there. In the case of Globus this is handled by the **Monitoring and Discovery Services (MDS)**.

Similar to the CPU case, information like, CPU usage, Memory & Software Installed is **traversed up a network tree** to a master node in its domain which can be queried.

The overhead and delays involved will reflect on the accuracy of the data and is a limiting factor limiting the **QoS** a grid can give.

This information is also used in **workflow managers** to reliably execute more complex data flows. (note Taverna)



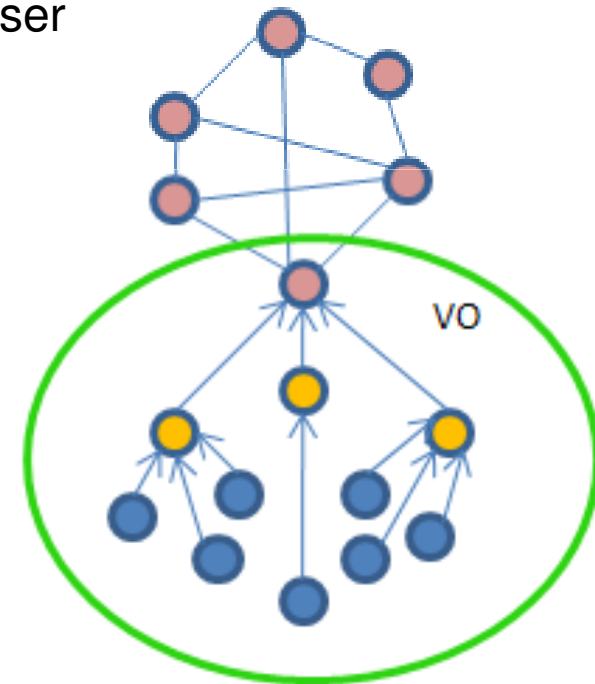
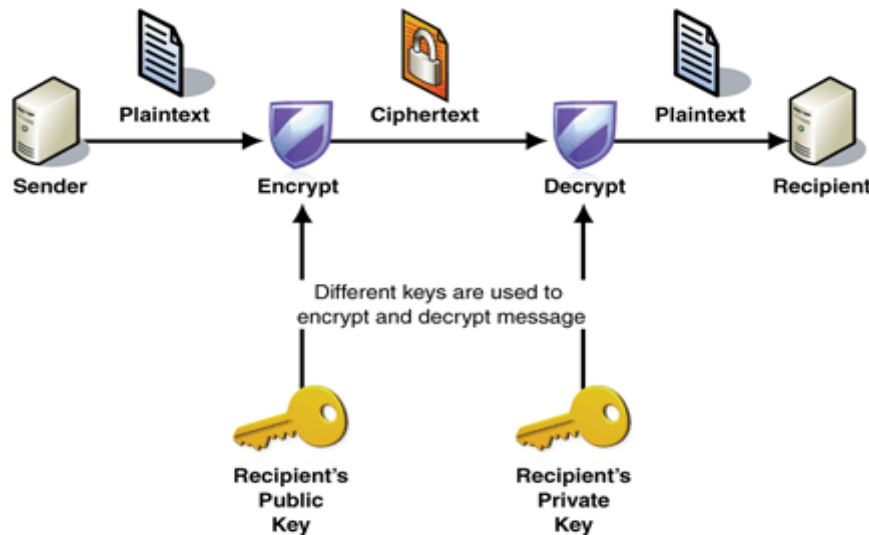
Security...



Given that possibly anyone can join or use a Grid (possible misuse), a management system was needed.

Trusted entities were established, mostly representing real organisations to **issues certificates** to users; And so this is what Grid consist of to date,

A collections of **Virtual Organisations** that handle user identification and log all usage by users for liability.



Communications...



In order for grid to communicate with each other a common language must be defined and work over the internet.

The most preferred protocol has now become **SOAP**, and is the Basis for **Web Services**.

This basically is similar to HTML/XML, and is in more or less **plain English** and can be read with notepad.

Two main things...

- 1) Services can be used using a web page
- 2) Jobs that are submitted are also in this format.

Still some people still like to use the command line.

Figure 1

```
<wsdl:message name="TitleInquirySoapIn">
  <wsdl:part name="parameters" element="tns:TitleInquiry" />
</wsdl:message>

...

<wsdl:types>
  <s:schema elementFormDefault="qualified" targetNamespace="http://mycounty.com/">
    <s:element name="TitleInquiry">
      <s:complexType>
        <s:sequence>
          <s:element minOccurs="0" maxOccurs="1" name="xmlstring" type="s:string" />
        </s:sequence>
      </s:complexType>
    </s:element>
  </s:schema>
</wsdl:types>
```



NGS

The NGS used to stand for the National Grid Services, but are undergoing a rebranding and can't shake of this term!

It is a free Grid for academic use consisting of many institutes....

**Imperial College
London**



 **University of
Reading**

MANCHESTER
1824



Brunel
UNIVERSITY
WEST LONDON



Science & Technology Facilities Council
Rutherford Appleton Laboratory

Royal Holloway
University of London

CARDIFF
UNIVERSITY
PRIFYSGOL
CAERDYDD



LANCASTER
UNIVERSITY
University
of Southampton





Because the NGS is an existing professional, entity – an executive decision has been made to off load all the management side of Grid computing at Middlesex to them.

This means that there is **always some one to support** your queries.

Also while we are formulating our resources at Middlesex, **we can use the existing facilities** already up and running provided by the NGS members.

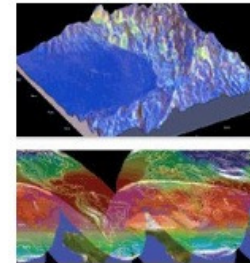
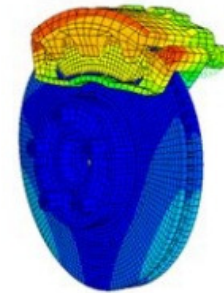
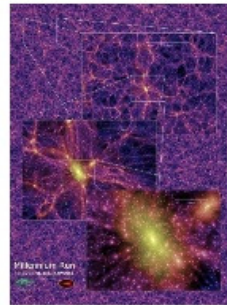
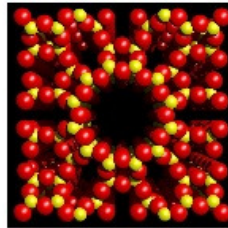
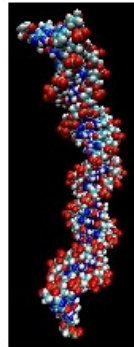
Why should we even bother with providing our resources? **Why not leech!**

Who Uses The NGS...

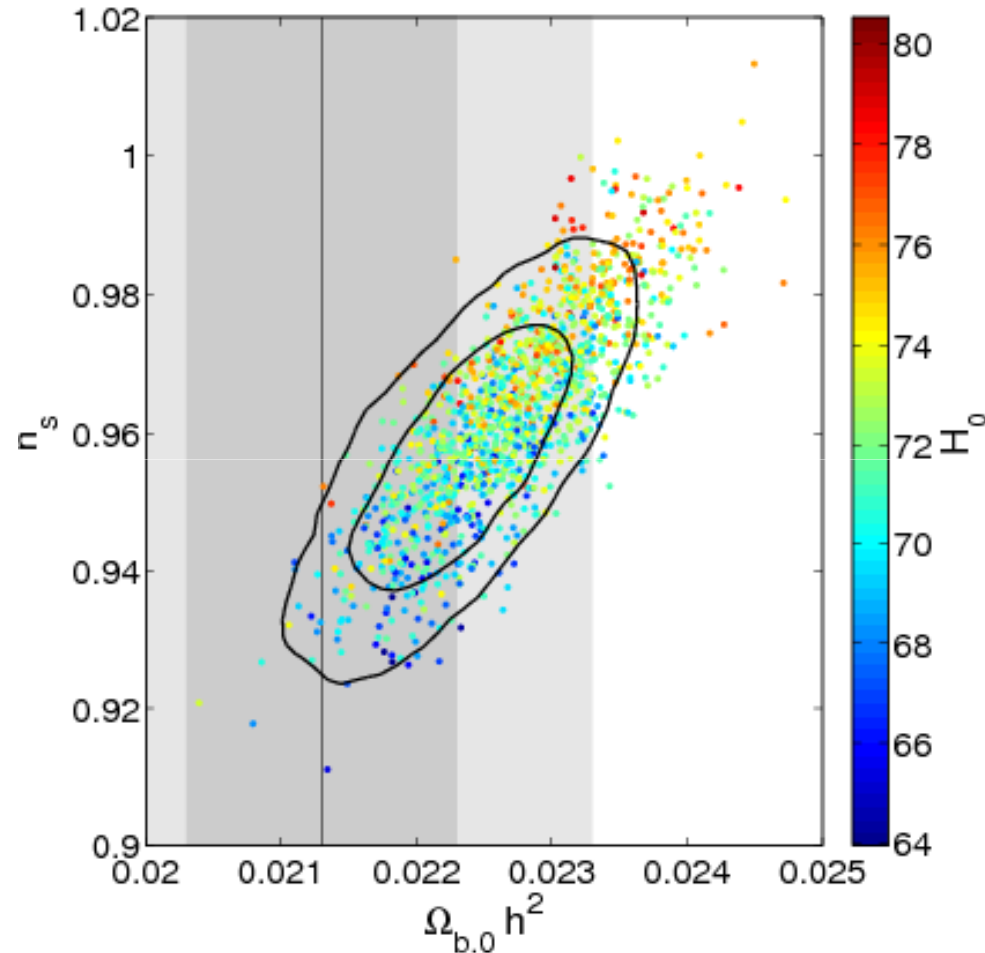
There are many applications in use, I however will go thorough just a few, one in each field.

NGS Scientific Software Applications

- **AstroPhysics**
- **BioMedical**
- **BioInformatics**
- **Chemistry**
- **Data Analysis**
- **Engineering**
- **Image Analysis**



CosmoMC...



CosmoMC is a Markov-Chain Monte-Carlo (MCMC) engine for exploring cosmological parameter space, together with code for analysing Monte-Carlo samples and importance sampling. The code does brute force (but accurate) theoretical matter power spectrum and Cl calculations with CAMB.

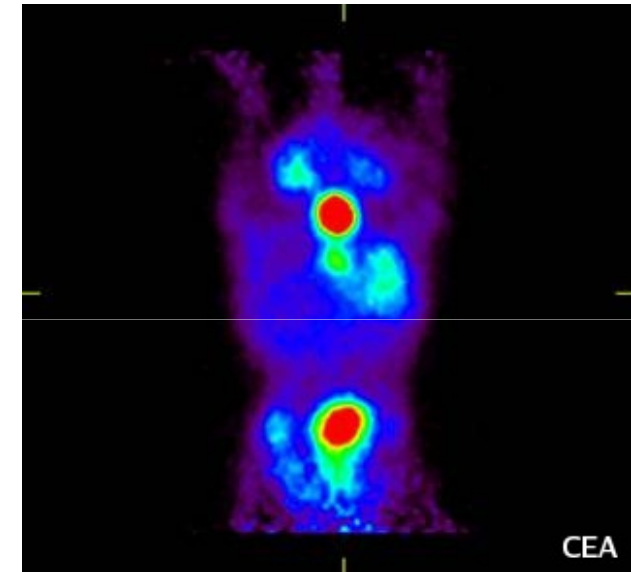


EMBOSS is a **suite of bioinformatics applications** i.e. sequence analysis programs and other assorted programs like enzyme kinetics.

[LINK TO LOCAL COPY](#)



Emission tomography and especially **Positron Emission Tomography (PET)** has a fast growing importance in modern medicine for both diagnostic and treatment purposes. At the same time there is a demand for higher **imaging** quality, accuracy and speed. Enhanced by the wider availability of powerful computer clusters, **Monte Carlo** simulations are an essential tool for current and future emission tomography developments. Examples for such developments are the design of new medical imaging devices, the optimization of acquisition protocols and the development and assessment of image reconstruction algorithms and correction techniques.



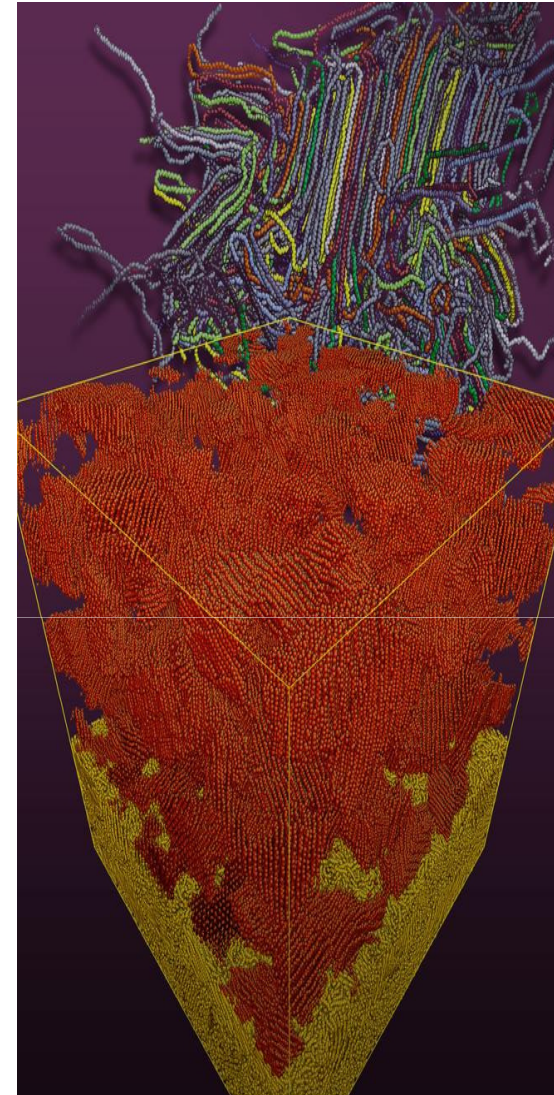
That's a MOUSE!

LAMMPS

LAMMPS has potentials for **soft materials** (bio-molecules, polymers) and **solid-state materials** (metals, semiconductors) and coarse-grained or meso-scopic systems. It can be used to model atoms or, more generically, as a parallel **particle simulator at the atomic, meso, or continuum scale**.

LAMMPS runs on single processors or in parallel using message-passing techniques and a spatial-decomposition of the simulation domain. The code is designed to be easy to modify or extend with new functionality.

LAMMPS is distributed by Sandia National Laboratories, a US Department of Energy laboratory.

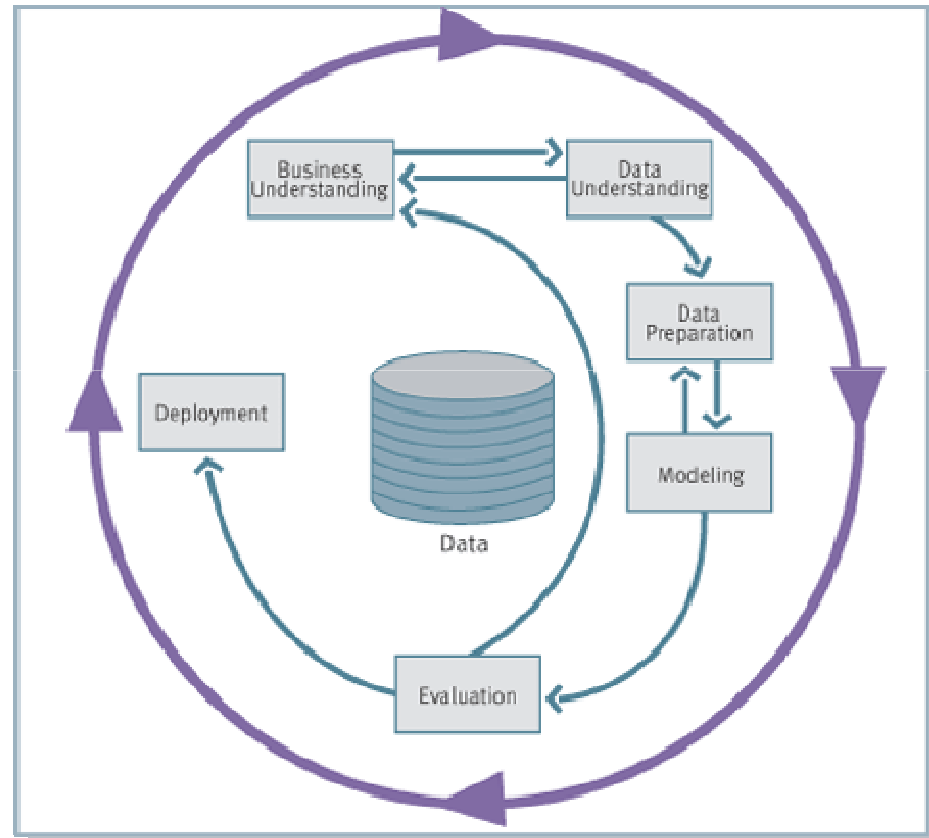




WEKA
The University
of Waikato

Weka is a **collection of machine learning algorithms for data mining** tasks. The algorithms can either be applied directly to a dataset or called from your own **Java** code.

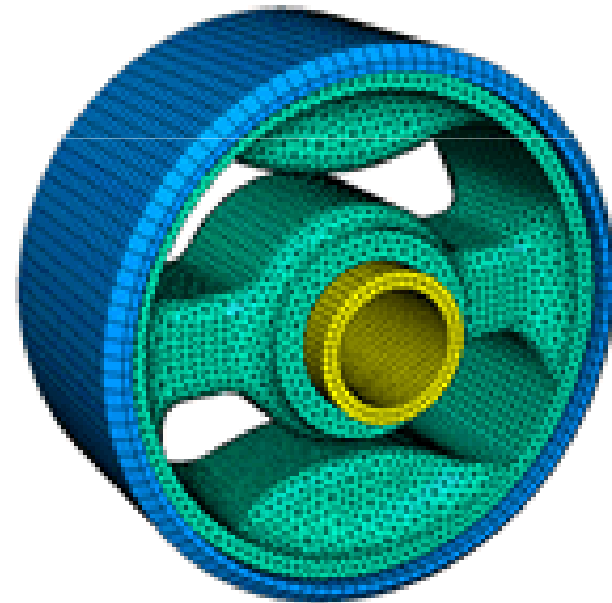
Weka contains tools for data pre-processing, classification, regression, clustering, association rules, and visualization. It is also well-suited for developing new machine learning schemes.



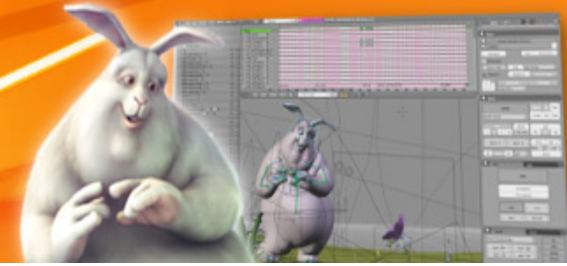
Abaqus...

Abaqus is a commercial **Finite Element Analysis** Program produced by Simulia.

According to the code authors "It allows the detailed behaviour of a complex assembly to be studied to: refine concepts for a new design, understand the behaviour of new materials, or simulate a discrete manufacturing process. The software suite delivers solutions for nonlinear problems and large-scale linear dynamics applications."



Blender



Blender is the free open source **3D content creation suite**, available for all major operating systems under the GNU General Public License.

It can be used for modelling, UV unwrapping, texturing, rigging, water simulations, skinning, animating, rendering, particle, and other simulations, non-linear editing, compositing, and creating interactive 3D applications, including games.

 blender™ 2.49_b
version 2.49_b

BlenderFoundation
www.blender.org 



Not what you want???

The above were only a few real examples, unfortunately what services that are on the **Grid are dictated by its user**. And as you may have noticed it was mostly modelling and simulations.

In reality, the grid should be as versatile as your normal desktop computer, so long as it can run on a computer, it can run on a grid.

Also if it is repetitive then you can almost certainly increase performance too.

Getting a NGS Certificate...

NGS Connecting Infrastructure, Connecting Research

Search this site

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<<Prev Certificates Home Next>>

Get an NGS account [General information about Certificates](#)

- OMII-UK Collaborations Workshop 2010 - registration now open!
- NGS roadshow at the University of Hull
- NGS user survey closes 20th January
- RA Training course
- IWSGC'10

[Read more...](#)

About NGS

Who we are and what we do

The National Grid Service (NGS) aims to enable coherent electronic access for UK researchers to all computational and data based resources and facilities required to carry out their research, independent of resource or researcher location.

Next Event

NGS roadshow at the University of Hull

The NGS will be hosting one of its popular roadshow events at the University of Hull in February. These events are designed to introduce researchers to the NGS and to let participants hear from NGS users about how they use NGS resources to help their research.

More information about this specific event (including a link to registration) can be found on the [event page](#). More information

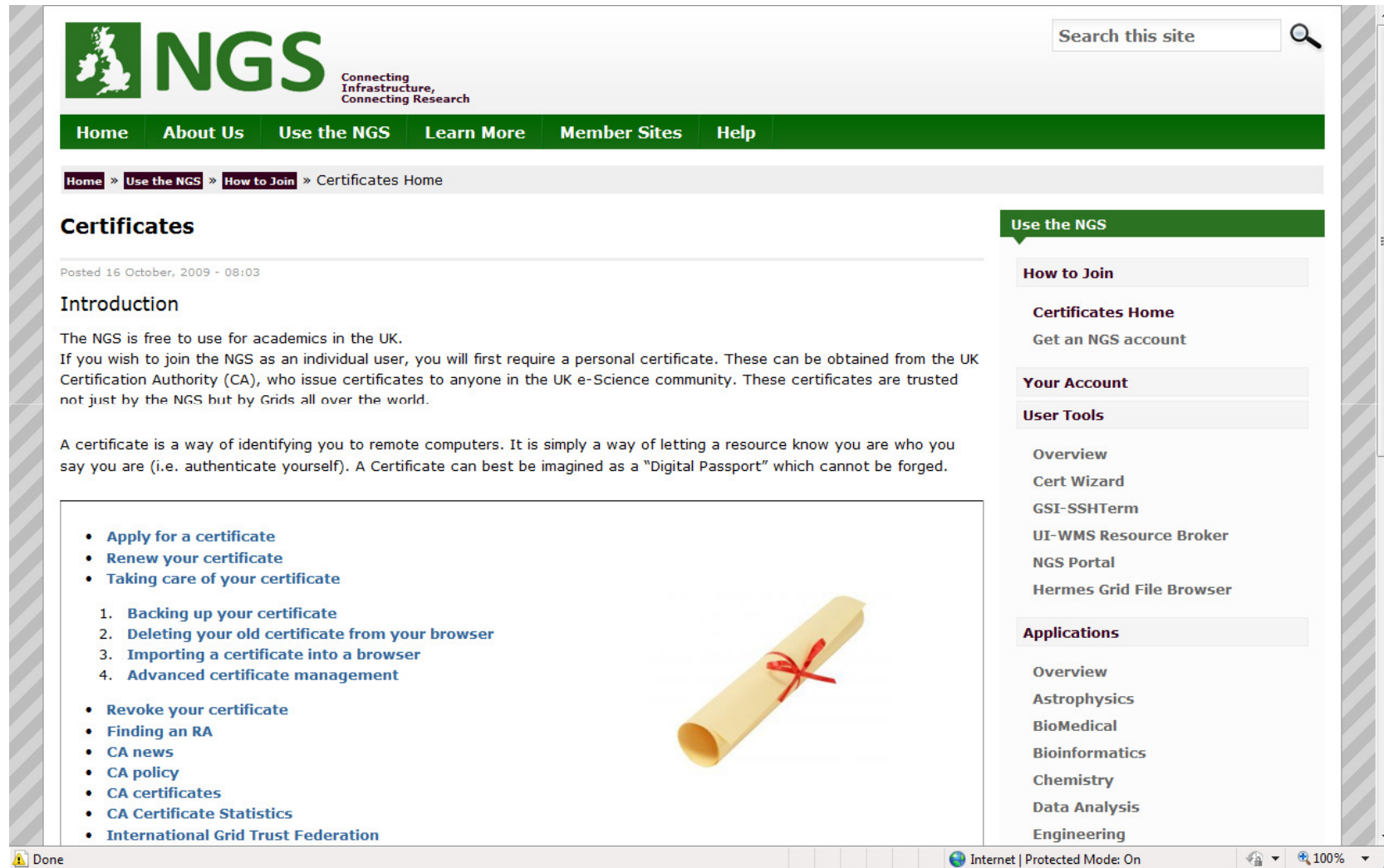
FEATURED

New user case study available from the NGS

A new user case study on high through-put virtual drug screening using the NGS is available now.

<http://www.ngs.ac.uk/certoverview> Internet | Protected Mode: On 100%

Getting a NGS Certificate...



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Home » Use the NGS » How to Join » Certificates Home

Certificates

Posted 16 October, 2009 - 08:03

Introduction


The NGS is free to use for academics in the UK. If you wish to join the NGS as an individual user, you will first require a personal certificate. These can be obtained from the UK Certification Authority (CA), who issue certificates to anyone in the UK e-Science community. These certificates are trusted not just by the NGS but by Grids all over the world.

A certificate is a way of identifying you to remote computers. It is simply a way of letting a resource know you are who you say you are (i.e. authenticate yourself). A Certificate can best be imagined as a "Digital Passport" which cannot be forged.

- [Apply for a certificate](#)
- [Renew your certificate](#)
- [Taking care of your certificate](#)

1. [Backing up your certificate](#)
2. [Deleting your old certificate from your browser](#)
3. [Importing a certificate into a browser](#)
4. [Advanced certificate management](#)

- [Revoke your certificate](#)
- [Finding an RA](#)
- [CA news](#)
- [CA policy](#)
- [CA certificates](#)
- [CA Certificate Statistics](#)
- [International Grid Trust Federation](#)



Use the NGS

How to Join

- [Certificates Home](#)
- [Get an NGS account](#)

Your Account

User Tools

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- [Cert Wizard](#)
- [GSI-SSHTerm](#)
- [UI-WMS Resource Broker](#)
- [NGS Portal](#)
- [Hermes Grid File Browser](#)

Applications

- [Overview](#)
- [Astrophysics](#)
- [BioMedical](#)
- [Bioinformatics](#)
- [Chemistry](#)
- [Data Analysis](#)
- [Engineering](#)

Done Internet | Protected Mode: On 100%

Getting a NGS Certificate...

NGS Connecting Infrastructure, Connecting Research

Search this site

Home About Us Use the NGS Learn More Member Sites Help

Home » Use the NGS » How to Join » Certificates Home » Apply

Applying for a Certificate

Posted 14 October, 2009 - 15:32

Before you apply for a certificate, please go to the [supported browsers page](#) to find out if your Internet browser is supported.

- If you would like to apply for an NGS account, you will need to apply for a personal certificate. Go to the [apply for a personal certificate page](#)
- If you would like to host a service, you will need to apply for a host certificate. Go to the [apply for a host certificate page](#)

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- Hermes Grid File Browser

Applications

- Overview
- Astrophysics
- BioMedical
- Bioinformatics
- Chemistry
- Data Analysis
- Engineering

Done Internet | Protected Mode: On 100%

Getting a NGS Certificate...

The screenshot shows the NGS website interface. At the top left is the NGS logo with the tagline 'Connecting Infrastructure, Connecting Research'. A search bar is located at the top right. A green navigation bar contains links for Home, About Us, Use the NGS, Learn More, Member Sites, and Help. Below this is a breadcrumb trail: Home > Use the NGS > How to Join > Certificates Home > Apply > Personal. The main heading is 'Applying for a Personal Certificate', dated 'Posted 14 October, 2009 - 15:39'. A blue box contains instructions: 'Below are the instructions on how to apply for a personal certificate, which is necessary if you would like to get an NGS account.' A yellow box with a warning icon states: 'Go to the [Supported Browsers page](#) to find out if your Internet Browser is supported, if you already haven't done so. For example on Vista, we don't support Internet Explorer.' The main content area lists seven steps for applying for a certificate. A right-hand sidebar titled 'Use the NGS' contains sections for 'How to Join' (Certificates Home, Get an NGS account), 'Your Account', 'User Tools' (Overview, Cert Wizard, GSI-SSHTerm, UI-WMS Resource Broker, NGS Portal, Hermes Grid File Browser), and 'Applications' (Overview, Astrophysics, BioMedical, Bioinformatics, Chemistry, Data Analysis, Engineering). The browser's status bar at the bottom shows 'Done', 'Internet | Protected Mode: On', and '100%' zoom.

NGS Connecting Infrastructure, Connecting Research

Search this site

Home About Us Use the NGS Learn More Member Sites Help

Home > Use the NGS > How to Join > Certificates Home > Apply > Personal

Applying for a Personal Certificate

Posted 14 October, 2009 - 15:39

Below are the instructions on how to apply for a personal certificate, which is necessary if you would like to get an NGS account.

Go to the [Supported Browsers page](#) to find out if your Internet Browser is supported, if you already haven't done so. For example on Vista, we don't support Internet Explorer.

1. Find your local Registration Authority by going to the [finding an RA](#) page
2. Download CA and root certificates into your Internet Browser using the two links [CA certificate](#) and [Root certificate](#). You will need to do this to make your browser "Trust" the CA (Certification Authority) website.
3. Go to the [CA Web Interface](#), then select "Request a Certificate" and then "User Certificate" (Note for Mozilla Firefox users: if you get the "Secure Connection Failed" error, go to our [frequently asked questions page](#)).
4. Select your local RA from the Registration Authority list that appears on the Certificate Request page (remember to look for your closest RA, see Step 2). You will need to enter a PIN that you will need to remember and keep safe. Click Continue to proceed.
5. A page showing a summary of the request will now appear. Check that your details (e.g. your name and your e-mail address) are correct, then click Continue.
6. The "Certificate Request Confirmation" page should then appear, showing you a summary of the details you entered to apply for a Certificate. We recommend you keep a copy of this page as it can help identify your certificate if there is a problem with the issuing process.
7. An email will then be sent to you confirming your request. It will also give you the details of your local RA operators (people who will be able to approve your request). You need to visit your nearest RA operator in person with your photo identification (we advise you to send an e-mail to arrange a time to visit). You will also be asked to put in your PIN number that you entered when you made the request. This is a security measure to ensure it was you who sent the request and not

Use the NGS

How to Join

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- Get an NGS account

Your Account

User Tools

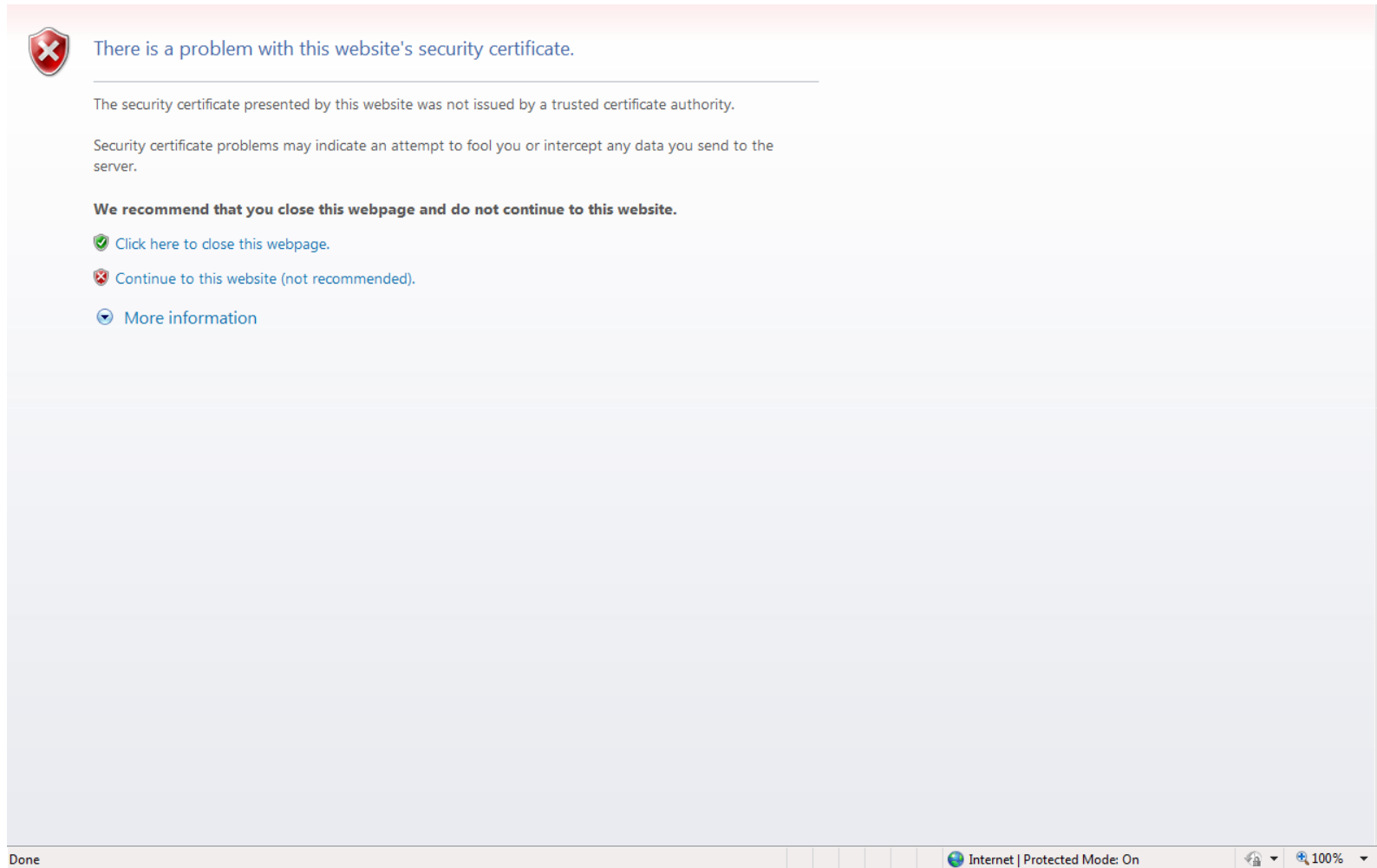
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- Bioinformatics
- Chemistry
- Data Analysis
- Engineering

Done Internet | Protected Mode: On 100%

Getting a NGS Certificate...






 There is a problem with this website's security certificate.

The security certificate presented by this website was not issued by a trusted certificate authority.

Security certificate problems may indicate an attempt to fool you or intercept any data you send to the server.

We recommend that you close this webpage and do not continue to this website.

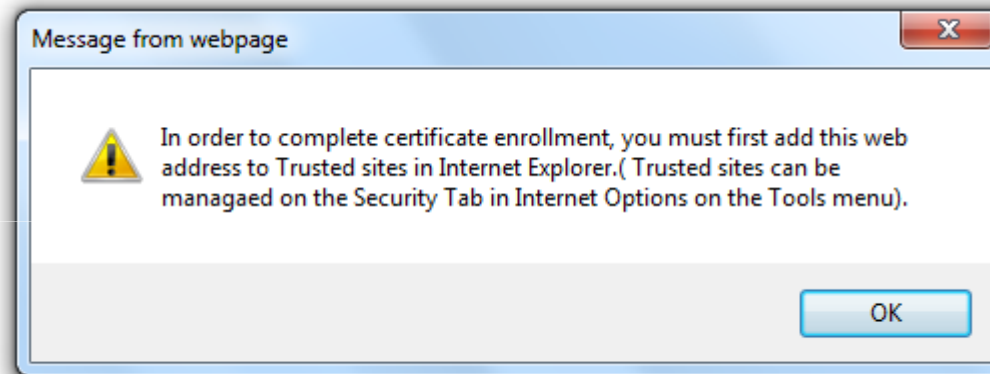
-  [Click here to close this webpage.](#)
-  [Continue to this website \(not recommended\).](#)
-  [More information](#)

Done

Internet | Protected Mode: On

100%

Getting a NGS Certificate...



Getting a NGS Certificate...

Certificates CA Info Help

Home Request a Certificate Retrieve New Certificate Test Certificate Renew a Valid Certificate Revoke Certificate

Based on OpenCA Server

Welcome

It looks like you are using an **unsupported browser**. Please see our [supported browsers page](#) as not all the functionality on the CA may work with your current browser.

Welcome to the [National Grid Service](#) Certification Authority website. Please read the information below to understand the process of obtaining a certificate. This page also includes information about who is allowed to request a certificate.

If you have any further queries please go to our [helpdesk](#) or refer to our [documentation](#).

Who can have a Certificate?

Anyone who is a member of the [UK e-Science](#) community or who is actively involved with an e-Science project.

Who should apply for a certificate?

You should apply for a certificate if you have not previously owned an e-Science certificate, or if your e-Science certificate has expired or has been revoked. If your certificate is going to expire and you would like to renew it before this time, you are only allowed to apply a maximum of one month before its expiry date.

How long is my certificate valid for?

All certificates currently being issued will expire after one year.

Why you need a Certificate

A certificate is used to prove your identity on the [Grid](#). If you do not have a certificate then you can not be given access to Grid resources.

The Basic Process:

1. You request a certificate from this site.
2. Your nearest [Registration Authority \(RA\)](#) will then require a face-to-face meeting with you to verify your identity. They will need to see your photo ID.
3. The RA checks the PIN that you entered when requesting your certificate.
4. Then the RA checks that you are part of a recognised organisation.

https://ca.grid-support.ac.uk/cgi-bin/pub/pki?cmd=getStaticPage;name=selectCSRtype Internet | Protected Mode: On 100%

Getting a NGS Certificate...

The screenshot shows a web application interface for certificate management. At the top, there is a navigation bar with tabs for 'Certificates', 'CA Info', and 'Help'. Below this is a secondary navigation bar with links: 'Home', 'Request a Certificate', 'Retrieve New Certificate', 'Test Certificate', 'Renew a Valid Certificate', and 'Revoke Certificate'. The main content area features a heading 'Request a certificate' and a text box explaining the process: 'To request a certificate use one of these links. You will be asked to fill in a form and to confirm the inserted data. After completing the request you will have to go to your chosen Registration Authority (RA) to approve the request.' Below this text are three links: 'User Certificate' (with subtext '[User Certificate Request]'), 'Server Certificate' (with subtext '[Server or Service Certificate Request]'), and 'PKCS#10 Request' (with subtext '[Upload a PKCS#10 PEM formatted Request]'). The browser's address bar at the bottom shows the URL 'https://ca.grid-support.ac.uk/cgi-bin/pub/pki?cmd=basic_csr&CSR_PROFILE=PERSON' and the status 'Internet | Protected Mode: On'.

Certificates CA Info Help

Home Request a Certificate Retrieve New Certificate Test Certificate Renew a Valid Certificate Revoke Certificate

Request a certificate

To request a certificate use one of these links. You will be asked to fill in a form and to confirm the inserted data. After completing the request you will have to go to your chosen Registration Authority (RA) to approve the request.

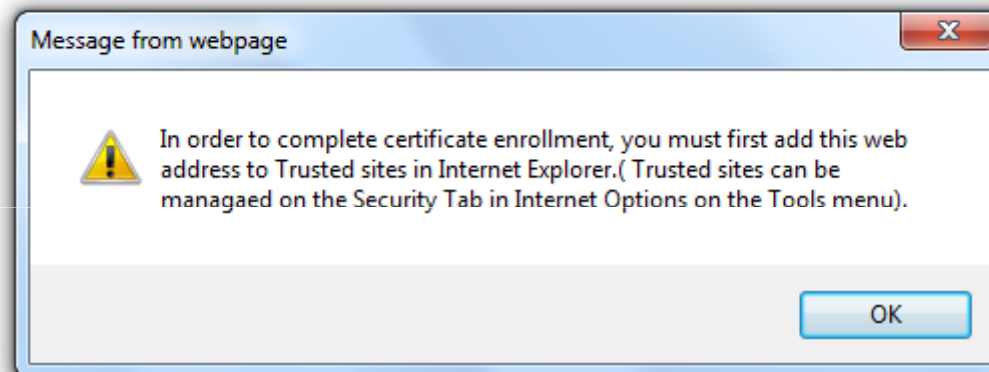
User Certificate
[User Certificate Request]

Server Certificate
[Server or Service Certificate Request]

PKCS#10 Request
[Upload a PKCS#10 PEM formatted Request]

https://ca.grid-support.ac.uk/cgi-bin/pub/pki?cmd=basic_csr&CSR_PROFILE=PERSON Internet | Protected Mode: On 100%

Getting a NGS Certificate...



Getting a NGS Certificate...

Certificates CA Info Help

Home Request a Certificate Retrieve New Certificate Test Certificate Renew a Valid Certificate Revoke Certificate

Basic Certificate Request

- Please enter your data in the following form.
- You should select the Registration Authority corresponding to your organization. Please click [here](#) for a list of all RAs.
- If you are at all in doubt, please consult the [user documentation](#).
- After completing the form, use the **Continue** button to proceed

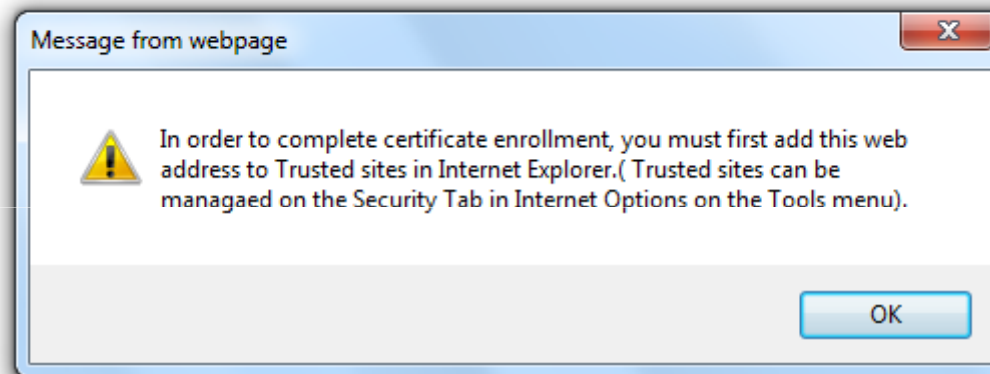
Certificate Data	
Name (firstname lastname)	<input type="text" value="Vijay Test Sahota"/>
Personal email address	<input type="text"/>

User Data	
Registration Authority (choose the RA where you will be authenticated)	<input type="text" value="Middlesex HSSC"/>
PIN (min 10 chars. Please remember it, your RA will ask for it.)	<input type="password" value="....."/>
Re-type your PIN (for confirmation)	<input type="password" value="....."/>

Special Capabilities	
<input type="text"/>	

Done Internet | Protected Mode: On 100%

Getting a NGS Certificate...




Getting a NGS Certificate...

Certificates CA Info Help

Home Request a Certificate Retrieve New Certificate Test Certificate Renew a Valid Certificate Revoke Certificate

- You can see the data you have entered below. Please check it carefully and follow the instructions to continue.
- Please check the keysize for your new certificate (this must be at least 1024 bits).
- If there are any problems with the displayed data, use your browser's back button to change any of the inserted data.
- If there are no errors, use the **Continue** button to generate the needed key pairs for requesting your certificate.

 The eScience Certification Authority (operated by STFC) will use the information you provide to generate a digital certificate. Your email address will be used to return this certificate to you and will not be made publicly available. By pressing Continue below, you agree that the information held in the certificate can be made publicly available. You agree that submitted information (including that which is not held in the certificate - e.g. PIN, and email for personal certificates) may be stored and processed by the CA.

Certificate Data	
Name (first last)	vijay test sahota
L	HSSC
OU	Middlesex
Personal email address	v.sahota@mdx.ac.uk

User Data	
Role	User
Registration Authority	Middlesex HSSC
Keysize for the new certificate (at least 1024 bits)	1024
Cryptographic device	Default

Continue

Done Internet | Protected Mode: On 100%

Getting a NGS Certificate...

Certificates CA Info Help

Home Request a Certificate Retrieve New Certificate Test Certificate Renew a Valid Certificate Revoke Certificate

Certificate Request Confirmation

Thank you for requesting your certificate from the UK e-Science Certification Authority. Your request has been successfully received and is now waiting for approval by your chosen Registration Authority (RA), shown below.

IMPORTANT

To complete the certification process you now have to go to your Registration Authority with one of the following documents:

1. ID card, Driving Licence or Passport
2. Documentation asserting your role and authorization for requesting a certificate for your organization

If you do not know who the Registration Authority at your organization is click [here](#).

NOTBEFORE	Tue Jan 19 09:38:59 2010 UTC
PIN	25c1cd954c5f9d83bd7b46ecb71c2db0145bc3a8
PROFILE	UKPERSON
RA	Middlesex HSSC
ROLE	User
SERIAL	4881184
SUBJECT_ALT_NAME	Email: V.Sahota@mdx.ac.uk
TYPE	SPKAC

Getting a NGS Certificate...

Dear user,

Thank you for requesting a certificate from the UK e-Science CA with Distinguished Name CN=vijay xps sahota, L=HSSC, OU=Middlesex, O=eScience, C=UK

Now please go to any one of your Registration Authority operators, bringing:

1. Photo id: valid passport (any country), or a UK driver's licence with photo id, or your site's photo id.
2. The PIN that you just used. The RA will ask you for it. It is to prove that *you* made the request.

Your Registration Authority operator(s):

Vijay Sahota

Getting a NGS Certificate...

Dear Customer,

Your certificate with the serial number 2xx60 and the DN:

/C=UK/O=eScience/OU=Middlesex/L=HSSC/CN=vijay xps sahota

has just been generated by the UK e-Science CA. You can import it directly into the same browser you requested the certificate from by following this link:

<https://ca.grid-support.ac.uk/cgi-bin/pub/pki?cmd=getcert&key=2xx60&type=CERTIFICATE&email=xxsxxxxa@mdx.ac.uk>

You can also do this by going to <https://ca.grid-support.ac.uk> and clicking on "Retrieve New Certificate" and entering the serial number: 2xx60 and email address: xxxxxxxx@mdx.ac.uk

Please don't forget to install the new CA certificates! As of December 2007, we have taken the precaution to generate new certificates, following a security incident:

<http://www.grid-support.ac.uk/content/view/182/184/>

For more information see the CA user documentation at:

<http://www.grid-support.ac.uk/content/category/5/25/42/>
