



Integrating HPC and the Grid – the STFC experience

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e-Science



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SCARF

Scientific Computing Application Resource for Facilities



Home | News | Hardware | Documentation | Groups | Advisory Board

Welcome to the SCARF homepage

SCARF is a compute cluster open to all STFC departments and Diamond, which is run by the e-Science Centre's HPC services group to encourage users to Grid-enable their high-performance computing needs.

[Click to log in](#)

[Click to run jobs](#)

Getting around and getting help

The site can be navigated using the links at the top of each page. If you need any help, please contact us via our support address, using the link at the bottom of each page.

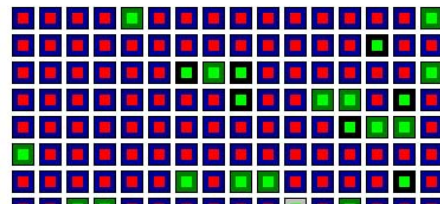
Staying informed

SCARF users can get up-to-date news via their choice of 3 sources:

- All users automatically receive e-mail via the SCARF-USERS mailing list.
- News can be read directly from this website on the News page.
- Or we have the SCARF RSS news feed.

SCARF queues

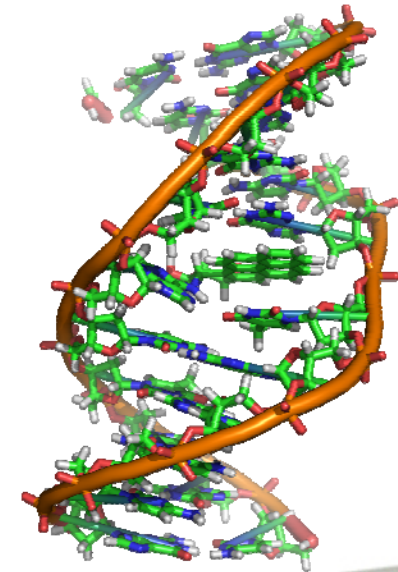
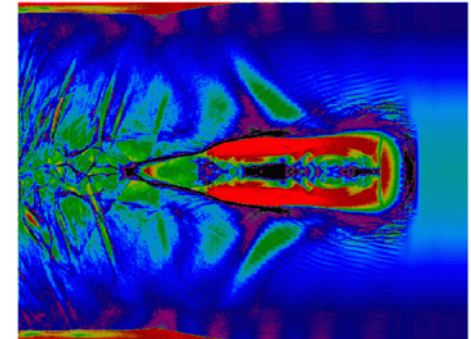
| Queue | Status | No. Jobs | Pending | Running |
|----------------|-------------|----------|---------|---------|
| scarf | Open:Active | 388 | 8 | 380 |
| scarf-clf | Open:Active | 168 | 0 | 168 |
| scarf-isis-iac | Open:Active | 1 | 0 | 1 |



- Computing cluster open to all STFC departments and Diamond (up to 1500 users)
- Run by the Scientific Computing and Technology Group

SCARF Usage

- Computational Chemistry (GAMESS, Gaussian)
- HE laser physics: experiment simulation and interpretation, Fusion research
- Protein simulation
- General Monte Carlo simulation etc.
- No major emphasis on storage



SCARF Hardware & OS



- 1,200 CPU cores
- 2.4 TB main memory
- Fast interconnect
- 35 TB storage space
- 10GB network uplink
- RHEL 4
- Globus 4



SCARF and the Grid

- SCARF started in June 2004
 - #315 of the top 500 at the time
- Adopted Grid security mechanisms in 2006
 - Access via GSI-SSHTerm
- Joined the UK NGS in Aug 2008
- Plans for future Grid technologies



Benefits of the Grid (for the sysadmin)

- Digital Certificates = Easier User Authentication
 - No more creation/deletion of user accounts & ssh passwords
 - No more vetting of identity (CA does this)
- Knowledge sharing with other experts
 - Software review delegated to community. Help available for installation
- Integrated Monitoring
- Better (free) publicity
- Lever extra resources



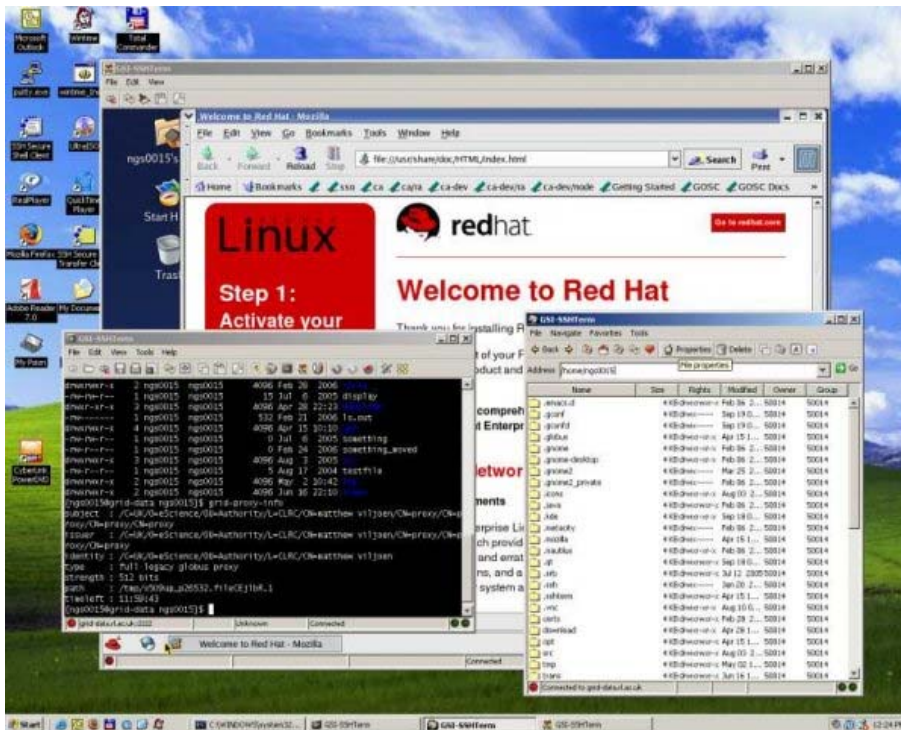


User perspective

- Previously used Putty + username/password
- Non computer literate users => X509 certificates cause problems:
 - understanding PKI
 - managing/converting certificates
- *No* real benefits of certs for users as yet
 - Mainly used for authentication, not SSO to other resources
- *But* now happy using GSI-SSHTerm app.
 - makes X509 usable & additional benefits
- Future potential benefits with Grid

GSI-SSHTerm

<http://www.ngs.ac.uk/gsi-sshterm>



- NGS developed GSISsh terminal emulator based on SshTools
- Java webstart application (Windows/Linux/Mac)
- Works with myproxy
- Pulls certificate straight out of browser
- File transfer GUI + VNC
- Sourceforge project sf.net/projects/gsi-sshterm
- Used by Teragrid, NCSA, ICEAGE and others

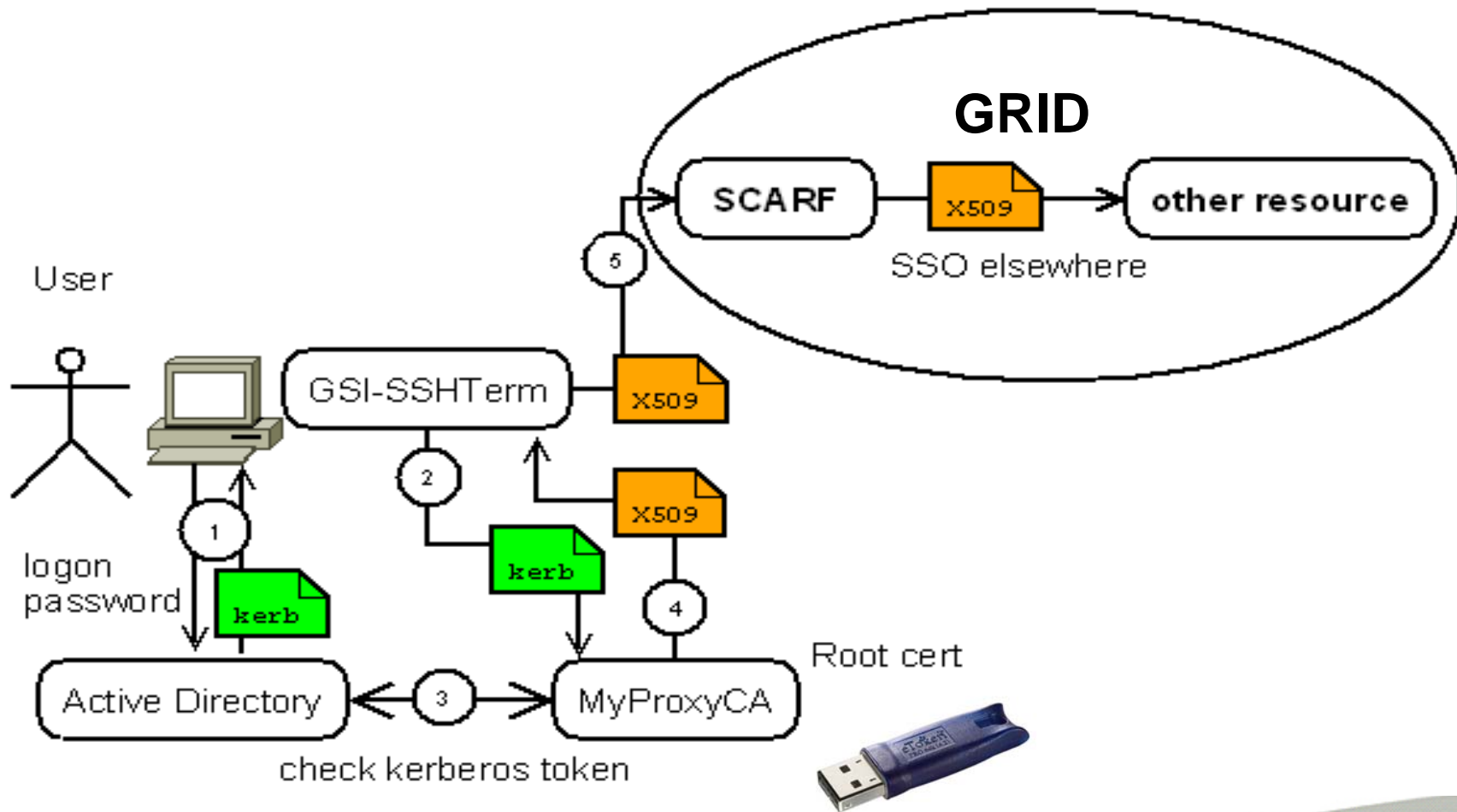


Single Sign On

- Certificates remain unpopular
- New Grid-based SSO solution to SCARF needed to provide ease of use and encourages uptake (SSO already there via proxy certs to other resources)
- Future SSO plans
 - Users need know *nothing* about PKI/certs
 - Transparent access via local AuthN mechanisms
 - Good integration with Windows & Linux/Mac with krb5
- Prototype already working with GSI-SSHTerm
- Big win for everyone!



SSO Solution Architecture





SSO Solution Architecture - explained

1. User logs into local PC within Active Directory domain. In Windows: gets a Kerberos token automatically.
2. User starts GSI-SSHTerm and points to Grid resource. GSI-SSHTerm picks up Kerberos token and sends to MyProxyCA server.
3. MyProxyCA checks validity of Kerberos token against Active Directory. If OK, a short-lived X509 certificate is generated.
- 4, 5. Certificate is used by GSI-SSHTerm to log into Grid resource.

-> User can then SSO to other Grid resource.

NB: Grid resources need to trust the MyProxyCA root certificate. The short-lived certificate DN must also be accepted.





Future technologies

- Not only AuthN: the 'true' Grid Vision
- Resource brokering for other Grid resources -> better scaling for big apps
- Application-specific GUIs and Portals
- Grid-enabled storage



Conclusion

- Scientists care little about technologies; just getting their work done
- GSISSH a success, *but* largely thanks to GSI-SSHTerm
- Grid = big benefit for sysadmins,
... but users will really benefit from true SSO, resource brokering and new portals

Grid is helping SCARF, but further development has been needed (GSI-SSHTerm, SSO)

- New technologies *must* be usable to end user



Acknowledgements

- The SCARF team; Duncan Tooke and Pete Oliver for providing feedback during development of Grid tools
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Questions?

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