



Clarens Client and Server Applications

CHEP 2003 March 24 - 28,

Grid Architecture, Infrastructure & Middleware

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Developed as part of the Particle Physics DataGrid





Web services: lots of hype very few applications

- **However**, several web-services applications have been built on the Clarens web service architecture. This talk will describe some of these:
- Proxy escrow
- •Web based Java/Javascript client
- •Access to JetMET data via SQL2Root
- •Root client access to remote data files
- •Access to files managed by the SDSC storage resource broker (SRB)





- Similar to MyProxy (http://www.ncsa.uiuc.edu/Divisions/ACES/MyProxy/)
- Eases administration of certificates and keys for users: credentials can be acessed using a browser
- Only need certificate distinguished name and password
- Some applications can not access a file system to read cert/key files (proxy credentials), e.g. Java applet in browser
- Credentials are stored in a database by the Clarens server. Communication encryption via SSL limits pilfering by eavesdroppers
- Data is encrypted before being stored, no password stored
- Benefits from the Clarens access control infrastructure





• API:

```
proxy.store(proxy, cert, password)
proxy.retrieve(DN, password)
proxy.delete(DN, password)
proxy.delete_admin(DN)
proxy.list()
```

- The last two are limited to administrators via ACLs
- Chicken-and-egg problem: Need key/cert to log into Clarens to retrieve key/cert!
- Solved by implementing an intermediary for proxy retrieval:





Java/ Javascript client



- First application to require proxy escrow
- Stand-alone Java client simple to implement Java crypto API unwieldy though
- Browser-based applet solves software distribution/installation problem
- BUT restrictions placed on applet:
 - •Unable to access filesystem
 - •Limited to certain APIs not allowed to access JCE/ JSSE
 - •Can only access server where applet was loaded from
- •Use bouncycastle.org crypto API instead
- •Use proxy escrow to access cert/keyfile instead of from filesystem
- •Use Javascript to manage web page contents presented to user



Java/ Javascript client II



Store proxy:

	Clarens P	roxy upload - Mozilla (Build	ID: 2003021212)				
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1	CHome Bookmarks QMembers QWebMail QConnections QBizJournal						
	Proxy Upload						
	Store type:	Separate key and certifica	ate files 💌				
	Proxy or key file:	nrad/.globus/userkey.pem	Browse				
	Certificate file:	nrad/.globus/usercert.per	Browse				
	Password:	****	100				
	Confirm password:	****					
П		Submit files	Clear values				
II							
	Security note:						
If you have JavaScript enabled, your browser might show a warning that a script wants to access the passwords in the above form. The script merely checks whether both passwords are filled in and matches.							
	ncerned about trusting the						
() 🞯 🕼 Done						

Ja	va/ Javascript client III
Retrieve proxy:	Clarens Proxy Retrieval - Mozilia (Build ID: 2003/021212) Ele Edit View Go Bookmarks Tools Window Help Debug Co O O O O O O O O O O O Co Home Bookmarks Members WebMail Connection Retrieve Proxy: Certificate subject: Password: Retrieve Clear values
File Edit View (Home Book Proxy r /O=doe	Proxy retrieval successful - Mozilla (Build ID: 2003021212)
S 🞯 🕼 Applet	elarens started



Java/ Javascript client IV



Delete proxy:

Clarens Proxy De	elete from proxy store - Mozi	ila (Build ID: 2003021212)
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Delete	Proxy:	
Certificate su	bject: VO=doesciencegrid.c	Org/O
Password;	Delete	Clear values
O 3 6 Dos	18.	



Access to CMS JETMet data



- •Part of the CAIGEE project to store CMS analysis data in SQL databases (Orace 9i and SQLServer)
- See http://pcbunn.cithep.caltech.edu/GAE/GAE.htm
- •OO data extracted from Objectivity DB stored in RDBMS
- •Clarens exposes API to pass data queries to SQL2Root backend
- •Data can be accessed using Root Clarens client or downloaded to client machine
- •API:

write_tree(tablename,where_clause,filename)

• Method implemented in C++, accessed via a Python wrapper





- •Root analysis environment widely used in HENP See: http://root.cern.ch
- •Client written in C+ + as a Root extension file
- •Can access any Clarens methods from command line
- •Special support for remote file access via the **TCWebFile** class, accessible as a Root file similar to a local file
- •Also **TCSystemDirectory** class for remote file browsing using the Root browser
- •Client used for distributed analysis demonstrations at SC2002 and iGrid2002.





•Examinig a remote file inside a Root object browser:

ROOT Object Browser				
Eile View Options				Help
🗃 ntp200 🔹 🚺				
All Folders	Contents of "/ROOT Files/c	larens://dhcp-126-194:80/~cc	onrad/pmc_jpsi_pmc-incljpsi_049.root/r	ntp200"
root	BVtxChi2	BVtxProb	Bcharge	-
home/conrad/hep/root/rootclie	CMenergyErr	Ford DeltaE	KStar CMEn	
ROOT Files	KStar CMp	KStar CMpt	KStar C Mpx	
E-Carens://dhop-126-194:80	KStar CMpy	KStar CMpz	KStar En	
ntp200	KStar Mass	Starmolundid	K Starmclundidmother	
	KStarmclundidmother2	KStarp	KStarpidid	
	KStarpt	KStarpx	K Starpy	
	KStarpz	KstarVtx Chi2	KstarVt×Prob	
	Cther BVtx Chi2	DtherBVtxProb	Our Broom	
	R2GL	R2GLWith Neut	Raw Bmass	
	beamEn	a conv Mass Minus	a conv Mass Plus	
	a conv Fi Minus	ConvRPlus	convVZ Minus	
	a convVZPlus	toos ThetaB	acos Theta Thrust	
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• •	adist BVert Z	avent 🔁	is Con Minus	-
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Root client access III



•Browsing a remote file system on two servers,

yamashita and heppc22:

ROOT Object Browser				
Eile View Options			Help	
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All Folders	Contents of "/manual/mod/mod	Lesi"		
🔲 root 📃	apache_ob.gif	feather.jpg	*	
home/conrad/hep/root/roo	index.html	mod_ssl_sb.gif		
ROOT Files	openssl_ics.gif	ssl_compat.gfont000.gif		
jamashita.	ssi_compat.html	ssl_cover_logo.ipg		
E- manual	ssl_cover_title.jpg	ssl_faq.gfont000.gif		
E- mod	ssi_faq.html	ssl_glossary.html		
E mod_python	ssl_howto.gfont000.gif	ssi_howto.html		
icons	ssl_intro.gfant000.gif	ssi_intro.html		
	ssl_intro_fig1.gif	ssl_intro_fig2.gif		
neppc22	ssl_intro_fig3.gif	ssl_overview.gfont000.gif		
addon-modules	ssi_overview.html	ssl_overview_fig1.gif		
C thurshs	ssl_reference.gfont000.gif	ssl_reference.html		
Condia Condia	ssi template head-chapter gif	ssl_template.head-num-1.gif		
E- album3	ssl_template.head-num-2.gif	ssl_template.head-num-3.gif		
thumbs	ssi_template.head-num-4.gif	ssl_template.head-num-5.gif		
	ssi template.head-num-6.gif	ssl template.head-num-7.gif	*	
49 Objects.	clarens-rpms-6.x			



SRB file access



- •The Storage Resource Broker is a network-enabled file and collection management system with a metadata catalog stored in an RDBMS (http://www.npaci.edu/DICE/SRB/)
- •A Python binding for the SRB C-client was developed at SDSC, and the API subsequently exposed via Clarens.
- •Since SRB uses a stateful network protocol, connections to the SRB server is opened and closed for every access by a Clarens client.
- •Work is under way to use a temporary pClarens instantiation for persistent connections to the SRB server.

```
    Api:
    connect(string srb_host, string srb_port,
string srb_domain, string auth_scheme,
string user_name, string srb_passwd)
    disconnect(string connection_id)
    read(string conn_id, string coll_name, string obj_id,
int oflag, int offset, int max_size)
```







• Client access is now available from a wide variety of client languages and environments:

•Python

•C/ C+ +

- •Root (C++)
- •Java application
- •Java/Javascript browser-based client
- •GUI and command-line clients allow the user to pick the most convenient interface for the task at hand.
- •Proxy escrow service allows access to Grid credentials from any web browser, or in environments where file access is impossible
- •SQL2Root and SRB services give access to new data storage media from within the Clarens client environment