

DE ROBERTO  
digital repository

GLibrary

la.musa  
Laboratorio multimediale e di archiviazione audiovisiva

GLite  
Lightweight Middleware for  
Grid Computing

# Digital libraries su Grid per preservare e diffondere il patrimonio umanistico

*Un caso d'uso:  
le opere di  
**Federico De Roberto***



**Antonio Calanducci**

[antonio.calanducci@ct.infn.it](mailto:antonio.calanducci@ct.infn.it)

**INFN Catania**

Conferenza GARR 2009, Napoli 30 Sett - 2 Ott

Network Humanitatis - linguaggi, risorse, persone







*I Vicere'.*

I.

il piacevole portone, siglandolo coi cardini o;  
chiuso, i passanti si spingono o si fermano;  
e il guardiano del palazzo, che ha il suo posto  
fianco al portone, che non v'è guardiano dell'altre;  
e a volte, se il guardiano è un uomo,  
si fa il segno della croce, e il suo bambino col quale si  
gioca, e si dà a qualche o quattro ingegni la  
mano.

chiusate il portone!... Subito il portone! e chiudete nel muro  
il cancello e tutti i parenti... La finestra della stanza  
della, la porta del giardino: chiudete tutto...  
fuggite - e morite!

~~Vive un signor. Dopo il partito indigeno, e, CERVINO  
ando il partito indigeno, e, CERVINO  
nte postum, che giurano in nome del partito del  
no lo stesso. Gli partiti si separarono, e, CERVINO  
una chiesa e curiosamente.  
morta? Grande~~

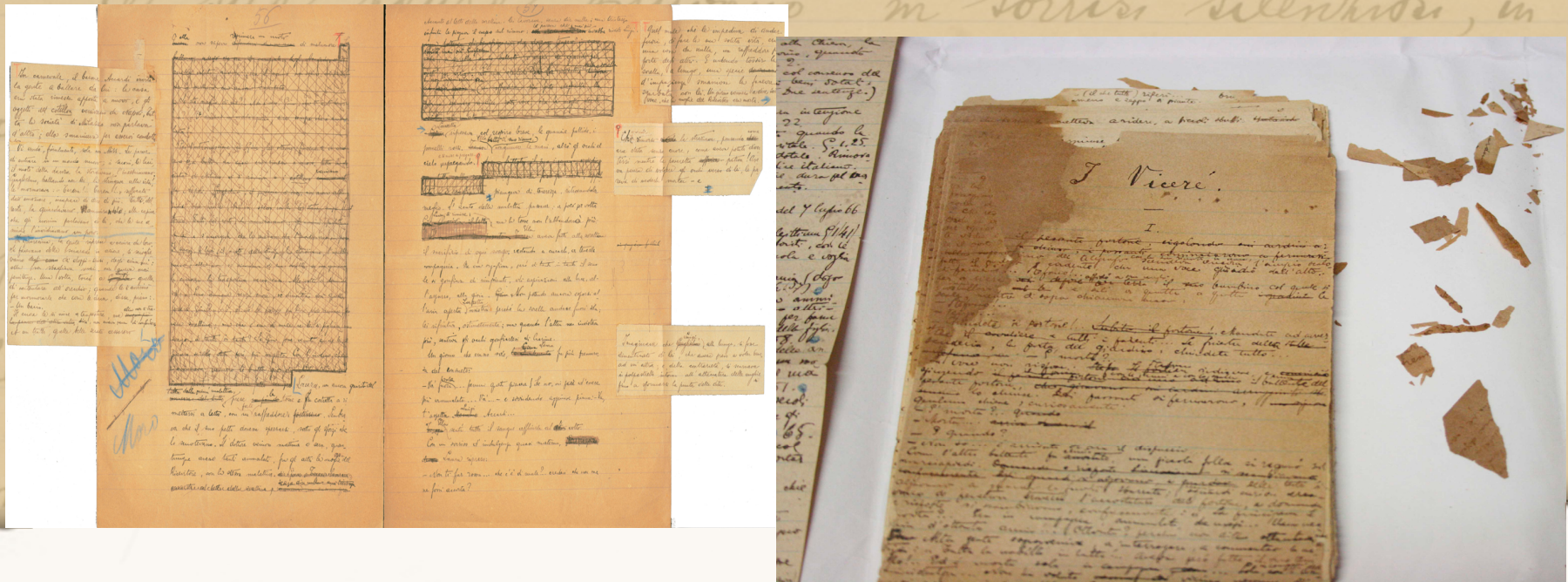
morte? Grande  
 ...  
 Grande?

... e rivestito di una <sup>o</sup> di dispersione  
l'altro balante <sup>o</sup> per <sup>o</sup> di <sup>o</sup> con pinola folta in <sup>o</sup>



# Digitalize to preserve them

- Some sheets are damaged (mold, crumbed pieces) and need physical restoration
- Digitalization to avoid the loss of this works, some of them still unpublished and relevant for the humanistic communities



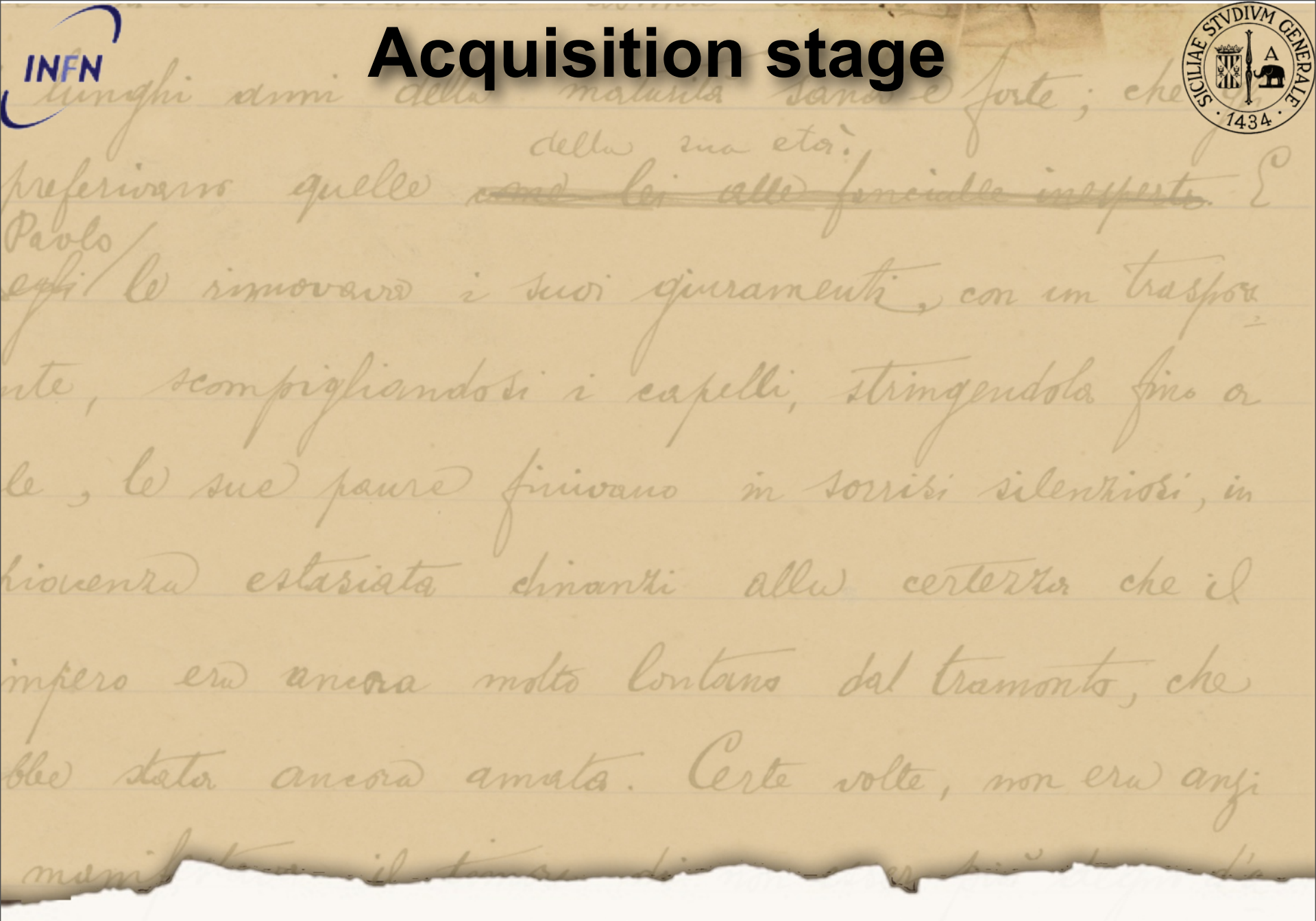
Data Grids for conservation of cultural inheritance - Conferenza GARR 09



ment' sotto del trionfo, del Rege e del Re  
Lionello, e di la Lionello, mandando al Conte  
ad una persona di spettabile ranko nella  
corte della Rege, nominato ancora il Portel  
non. Conto non più ottenere la conferma  
dell'opera Rege, e non per più apparenza del  
Lionello, mandando, dove per essere fatto in  
partito di Rege e Lionello, e, tuttavia, tanto  
la morte del Re Lionello, finalmente, il suo elio  
quello equamente della morte del Lionello  
per conto di un Lionello Rege, la sua morte  
la morte Lionello del Rege, e alla morte  
del Rege e alla morte di Lionello Rege, l'elio  
quello fatto del Re e alla sua morte affatto, con  
la morte Lionello e Lionello del Lionello.  
Lionello Rege Lionello, finalmente, Lionello e Lionello  
Lionello Rege Lionello, finalmente, Lionello e Lionello



# Acquisition stage





# Acquisition stage



- **Digitalization** of manuscripts, typescripts, printed works
  - **TIFF Files**, one per page, 600 dpi, about 100MB for A3
    - High resolution scans for in-depth examination
  - **PDF**, one per work, 300 dpi, varying file sizes 40-400MB
    - Overall examination of works
  - 8000 sheets/scans, 3 Terabyte of disk space
  - Different physical formats, A3/A4/custom size

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  - 8000 sheets/scans, 3 Terabyte of disk space
  - Different physical formats, A3/A4/custom size
- **Embedded Metadata**
  - TIFF with embedded metadata to provide scan physical features and information about the content
    - ImageWidth, ImageHeight, XResolution, FileSize, CreationDate, ModifyDate
    - Description, Keywords, CaptionWriter, Title, Author, Copyright Status, Copyright Notice
  - Added with Photoshop after the digitalization phase (Adobe **XMP** format)



# Goals and requirements



lunghe... della sua età:  
preferivano quelle ~~come lei alle~~ ~~fanciulle~~ ~~inesperte~~.  
Paolo  
egli le rinnovava i suoi giuramenti, con un traspor-  
te, scompigliandosi i capelli, stringendola fino a  
le, le sue paure finivano in sorrisi silenziosi, in  
biondenza estasiata dinanzi all'u certezza che il  
impero era ancora molto lontano dal tramonto, che  
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manifesto il timore di non aver più tempo da

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- Make those works **accessible** to the humanistic communities
  - **Always on-line**: 24 x 365
  - **Available from everywhere**
  - Simple and **easy-to-use interface** for non-expert people



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  - Document organization according the physical and semantic metadata
    - Organization by type/collections
    - Dynamic filtering of search result sets according the selection of one or more document metadata

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- **Long-term preservation** (digital preservation)
  - Multiple copies (**replicas**) spread in different geographical sites
  - Reliability of storage systems and replica redundancy to achieve secure preservation



# Data Management in Grid



- **Storage Element(SE):** front-end server aggregating a set of networked (pool) hard disks providing the illusion of a **big (virtual) disk**
  - “container” of users’ files
  - generally one SE per site
  - mirrored disks to avoid data loss in case of hardware failures
  - fine-grained set up of file permissions: owner, group, given lists of users and groups (Access Control Lists - ACLs)
  - Keep the mapping file-physical disk of the pool
- **File Catalogue:** provide a unique virtual file system among several Storage Elements: keep track of which SE (or SEs) contains a given file
  - keep track of replicas
  - mapping file-Storage Element filename



# Data Management in Grid



- **Metadata Catalogue**: store and organize metadata of files saved on Storage Elements and registered on the File Catalogue
  - metadata organized by “collection” (sort of directory)
    - each collection has its **schema**, a set of defined **attributes**:
      - es: /deroberto/scans/manuscripts
        - o Title: “La lupa”
        - o Author: “Federico De Roberto, Giovanni Verga”
        - o Genre: “Tragedia Lirica”
        - o Pages: 34
        - o FileType: TIFF
        - o surl: srm://inf-n-se-01.ct.pi2s2.it/dpm/ct.pi2s2.it/home/cometa/generated/2008-06-14/filede4d6266-56c4-4d66-95b6-3d69063ef081
  - responsible to answer users’ queries against metadata describing files, to find out their physical location for future retrieval



# What Data Grids can offer to them



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Paolo  
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# gLibrary features

- INFN-developed tool totally **GLite** based
- It allows to **store, organize, browse & search** and **retrieve** digital assets on a Grid environment with an intuitive front-end
- **Digital Assets** examples:



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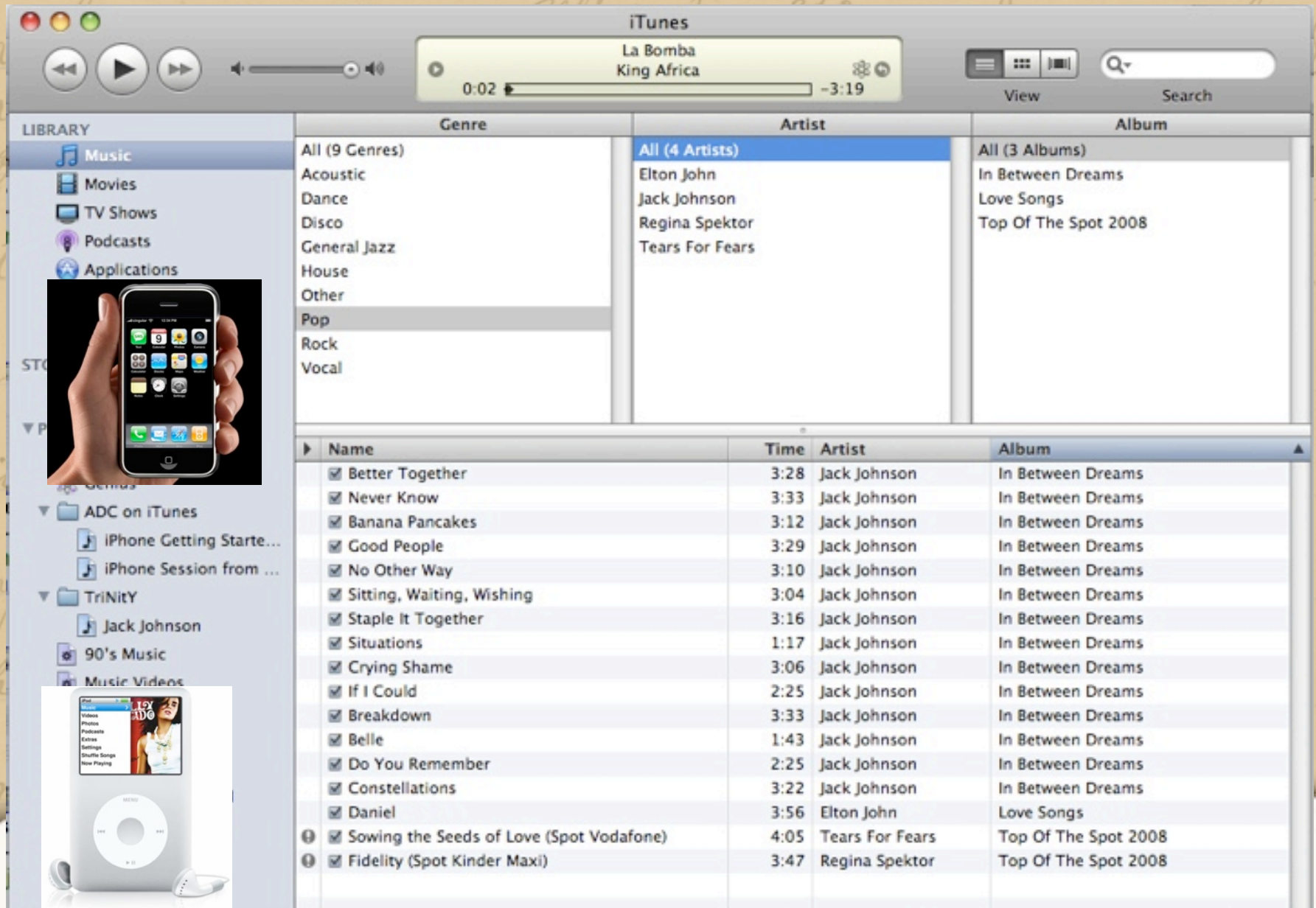


## Web 2.0 in eight key concepts

1. User Generated Content (UGC)
2. semantics
  - formal ontologies
  - social tagging
3. collaborative filtering
4. RSS feeds
5. embedding, reuse, mash-up
6. social networks
7. page interaction (Ajax, WebApps, widgets)
8. interface design



# gLibrary as the iTunes for the Grid





# Browse & Search



**Repositories**  
Current : EELA

**Trees**  
Types Collections

name

- Presentation
- Training
- Press Room
  - Bulletins
  - Sheets
  - Newsletters
  - Press Releases
  - Brochures

**Filter attributs**  
Speaker Event Subject

**Filter's values**

Speaker	Event	Subject
Giuseppe La Rocca	gLite Tutorial for Health-e-Child	DMS
Giuseppe Platania	Tutorial per gli Insegnanti degli Istituti Tecnici Industriali	general presentation
Tony Calanducci	Tutorial TriGrid su gLite 3	gLite DMS
Valeria Ardizzone	-No available-	gLite DPM installation

**Actions:** + Add Filter ✗ Remove Filter Save display

Title	Runtime	Speaker	Subject	Event
Archicture of the gLite Data Management System	45	Tony Calanducci	gLite DMS	Tutorial per gli Insegnanti degli Istituti Tecnici Industriali

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# Browse & Search



- Assets can be browsed selecting a type (or collection) and selecting one or more **filters**:
  - attributes of the selected types, chosen from a defined list, used to narrow the result set

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# Browse & Search



- Assets can be browsed selecting a type (or collection) and selecting one or more **filters**:
  - attributes of the selected types, chosen from a defined list, used to narrow the result set
- Filter application is cascading and context-sensitive: the selection of a filter value dynamically influences subsequent filter values (“à la iTunes” browsing)
  - Classical search by description and keywords available too

The screenshot displays the INFN browsing interface. On the left, a 'Repositories' tree shows the 'EELA' repository selected. The 'Types' tab is active, showing a list of categories like 'Presentation', 'Training', 'Press Room', 'Bulletins', 'Sheets', 'Newsletters', 'Press Releases', and 'Brochures'. The 'Training' category is selected. The main area shows 'Filter attributes' with dropdowns for 'Speaker', 'Event', and 'Subject'. Below these are 'Filter's values' lists for each attribute. The 'Speaker' list includes 'Giuseppe La Rocca', 'Giuseppe Platania', 'Tony Calanducci', and 'Valeria Ardizzone'. The 'Event' list includes 'gLite Tutorial for Health-e-Child', 'Tutorial per gli Insegnanti degli Istituti Tecnici Industriali', 'Tutorial TriGrid su gLite 3', and '-No available-'. The 'Subject' list includes 'DMS', 'general presentation', 'gLite DMS', and 'gLite DPM installation'. Below the filters are buttons for 'Add Filter', 'Remove Filter', and 'Save display'. At the bottom, a 'Data Grid' shows search results with columns for 'Title', 'Runtime', 'Speaker', 'Subject', and 'Event'. The first row shows 'Archicture of the gLite Data Management System' with a runtime of '45', speaker 'Tony Calanducci', subject 'gLite DMS', and event 'Tutorial per gli Insegnanti degli Istituti Tecnici Industriali'.

Title	Runtime	Speaker	Subject	Event
Archicture of the gLite Data Management System	45	Tony Calanducci	gLite DMS	Tutorial per gli Insegnanti degli Istituti Tecnici Industriali

# Organize assets

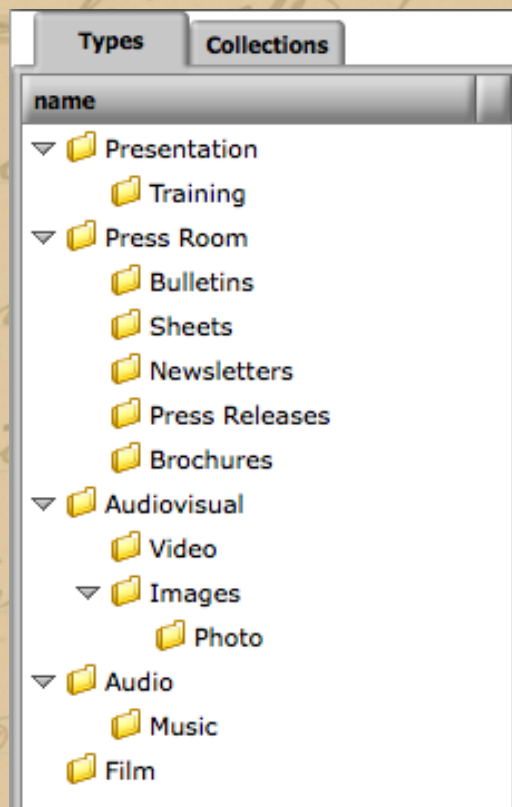
- “Types” and “Collections” definition by repository providers/admins:

- Assets are organized by **type**:

- a list of specific attributes to describe each kind of asset to be managed by the system
- hierarchical (a child type shares and extend parent's attributes)
- queried during searches

EXAMPLE OF TYPES AND ATTRIBUTES' LIST

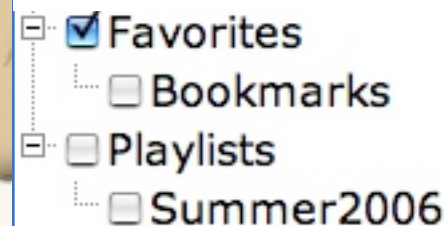
Type	Attributes' list
Audio	Format, Bitrate, Samplerate, Time
Music	(Format, Bitrate, Samplerate, Time), Name, Artist, Album, Genre, Tracknumber, Year, Artwork, Lyric, Rating
Presentation	Format, NumOfPages
Training	(Format, NumOfPages), Title, Runtime, Speaker, Author, Subject, Event, Date, Type
(Root)	FileName, SubmissionDate, Description, Keywords, LastModificationDate, Size



and/or organized by **collection**:

- Group together related assets even of different types;
- Useful also to define subsets of assets belonging to the same type
- Multiple category assignment per asset (tagging like)

## Collections



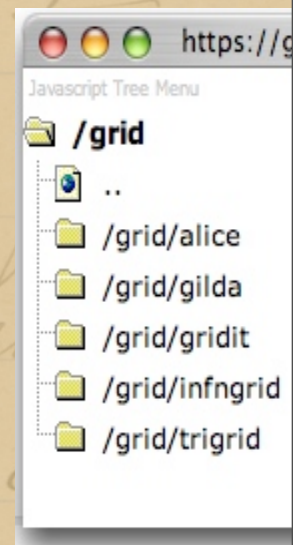
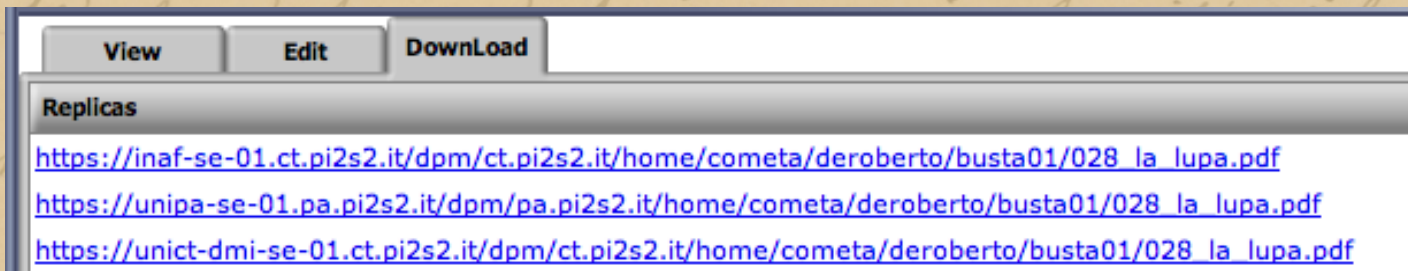
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# Store & Retrieve

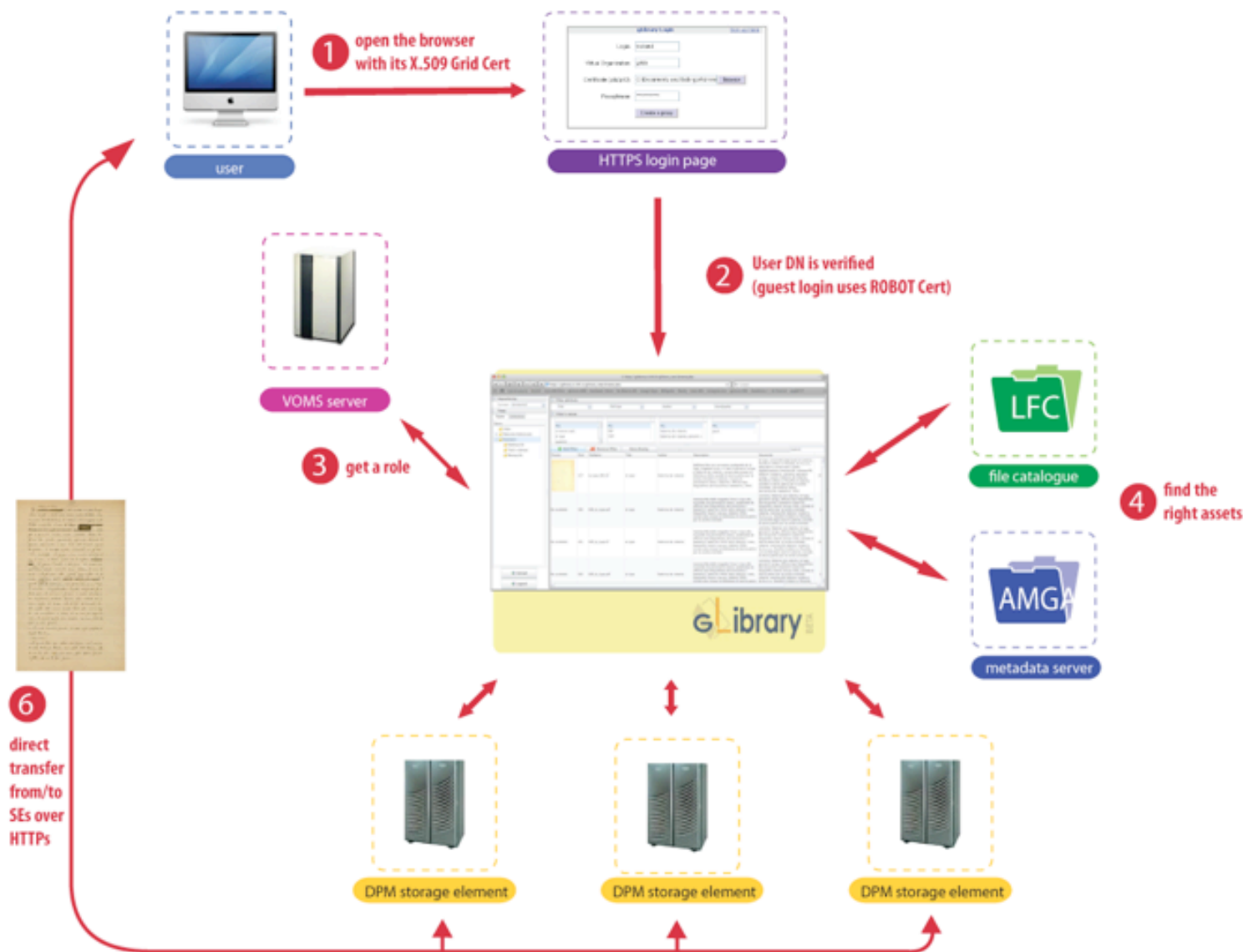


- Users can **upload** their local assets on one or more (creating replicas) Storage Elements of the Grid
  - Files already on grid SE can be **registered** in a gLibrary repository by the LFC File Catalogue browser
- **Download** from SEs to the users' laptop/desktop:
  - selection of a replica link from a list



- Transfers are handled from the browser over **HTTP/HTTPS** provided that users have their own **X.509 Grid Certificate** imported

# gLibrary Architecture





# Technologies used



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  - Storage Element **SRM** interface to get the TURLs (Transfer URLs)
  - Transfers handled with **GridFTP** and X.509 cert auth **HTTPS**
  - X.509 based Globus Security Infrastructure with the VOMS extensions to handle authentication and authorization (ACL based) on Metadata and Storage Elements
  - All grid services implemented with the EGEE gLite middleware (**DPM** Storage Elements, **AMGA** Metadata Catalogue, **LFC** File Catalogue, **VOMS** Services)

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  - All grid services implemented with the EGEE gLite middleware (**DPM** Storage Elements, **AMGA** Metadata Catalogue, **LFC** File Catalogue, **VOMS** Services)
- Other standards:
  - Subset of XMP Metadata
    - *Dublin Core Metadata* set will be included in the next release
  - Data Grids for conservation of cultural inheritance - Conferenza GARR 09

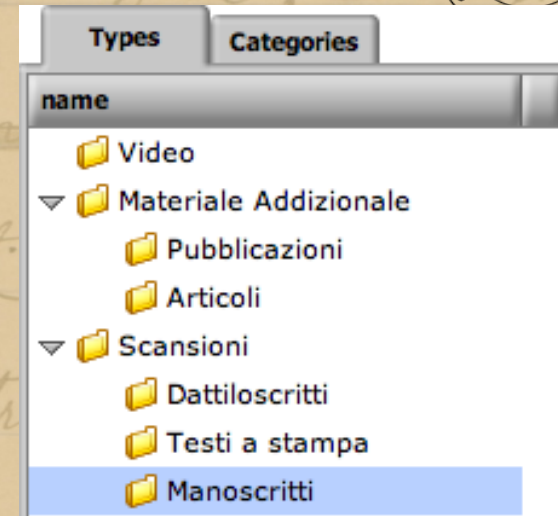


# Metadata used in the DR digital library



- Types definition for the assets of the DR repository ----->>>>
- Attributes definition per type. Es (manoscritti):

Attributo	Valore
Title	la lupa
Author	federico de roberto, giovanni verga
Description	manoscritto della tragedia lirica ...
Keywords	verismo, federico de roberto, la lupa, ...
CaptionWriter	stefania iannizzotto, alessandro ...
CopyrightStatus	copyrighted
PageNum	5
TotalPages	34
DocumentGenre	tragedia lirica
PublicationYear	1916
Publisher	officine tipo-litografiche barravecchia e balestrini
FileType	PDF
Resolution	300
ScanQuality	good

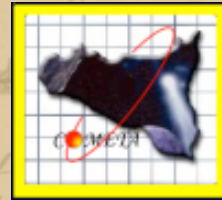
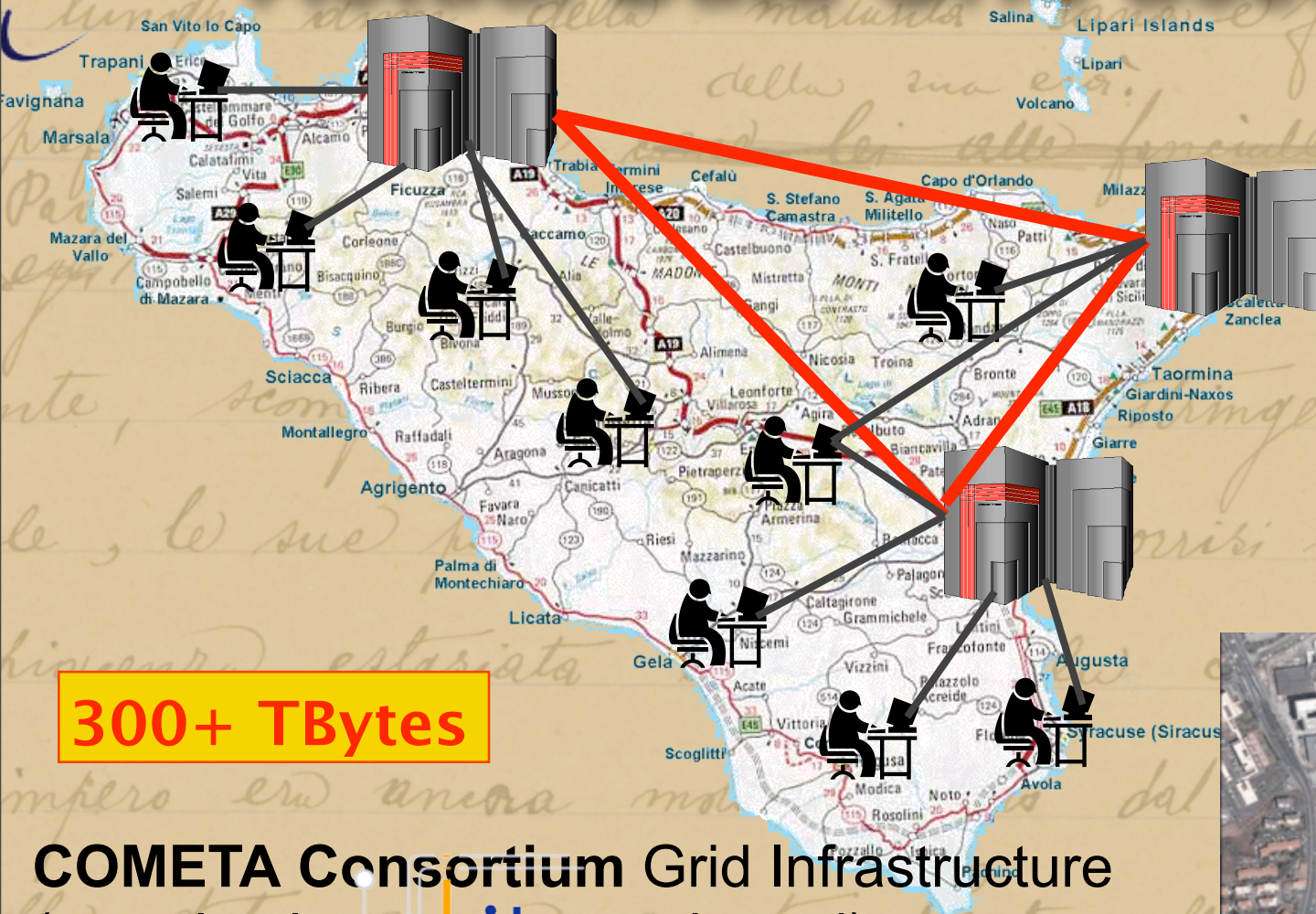


- Filter defined per type. Es:

- DocumentGenre
- Title
- FileType
- ScanQuality
- DocumentType
- PublicationYear
- PublicationStatus
- Publisher
- Location



# Actual Data Grid used



**COMETA Consortium Grid Infrastructure**  
(completely **GLite** based)  
[www.consorzio-cometa.it](http://www.consorzio-cometa.it)



# Who can benefit from gLibrary



- Community that has medium/large digital objects repositories to share in **a short time**
  - files can be taken on their servers if the are reachable from Internet and/or moved to Grid SEs
- Upcoming deployment of new reps:
  - Mediterranean Heritage Repository (\*)
  - 250.000 musical scores of ancient Neapolitan musicians
  - digitized documents coming from Sicilian Library (Verga manuscripts)

(\*) Ref: G. Di Gregorio et al. -GARR'09

## un caso di studio



GLibrary with De roberto digital repository



https://glibrary.ct.infn.it/glibrary\_new/ربول.html

https://glibrary.ct.infn.it/glibrary\_new/ربول.html

Google

Invio SMS Alice Facebook Home De Roberto DR Google Maps Wikipedia Macity Voda SMS Usingmac.com gLibrary/DRI Rapidshare SA Tutorial app@ICTP ICTP Phone Book

https://glibrary.ct.infn.i... gLibrary Login

**Repositories**

Current: deroberto2

**Trees**

Types Categories

name

- Video
- Materiale Aggiuntivo
  - Pubblicazioni
  - Articoli
- Scansioni
  - Dattiloscritti
  - Testi a stampa
  - Manoscritti

Filter attributs

FileTypeDocumentTypeAuthorLocation

Filter's values

PDF  
TIFF

dattiloscritto  
manoscritto  
-No available-

federico de roberto  
federico de roberto, giovanni v

busta 01  
busta 02  
busta 11

+ Add Filter

- Remove Filter

jsevilla

FILE	Title	Description	PagNum	TotalPages	CaptionWriter	Size	FileType
100	la lupa	manoscritto della tragedia lirica in due atti, musicata da pierantonio tasca, pubblicata da officine tipo-litografiche barravecchia e balestrini, palermo 1919; altre edizioni: noto, tipografia rosario caruso, ottobre 1932; conservato presso la biblioteca di storia patria per la sicilia orientale	28	34	stefania iannizzotto, alessandro de filippo	15736028	PDF
101	la lupa	manoscritto della tragedia lirica in due atti, musicata da pierantonio tasca, pubblicata da officine tipo-litografiche barravecchia e balestrini, palermo 1919; altre edizioni: noto, tipografia rosario caruso, ottobre 1932; conservato presso la biblioteca di storia patria per la sicilia orientale	29	34	stefania iannizzotto, alessandro de filippo	107433936	TIFF
102	la lupa	manoscritto della tragedia lirica in due atti, musicata da pierantonio tasca, pubblicata da officine tipo-litografiche barravecchia e balestrini, palermo 1919; altre edizioni: noto, tipografia rosario caruso, ottobre 1932; conservato presso la biblioteca di storia patria per la sicilia orientale	29	34	stefania iannizzotto, alessandro de filippo	15542633	PDF
103	la lupa	manoscritto della tragedia lirica in due atti, musicata da pierantonio tasca, pubblicata da officine tipo-litografiche barravecchia e balestrini, palermo 1919; altre edizioni: noto, tipografia rosario caruso, ottobre 1932; conservato presso la biblioteca di storia patria per la sicilia orientale	30	34	stefania iannizzotto, alessandro de filippo	107433772	TIFF
104	la lupa	manoscritto della tragedia lirica in due atti, musicata da pierantonio tasca, pubblicata da officine tipo-litografiche barravecchia e balestrini, palermo 1919; altre edizioni: noto, tipografia rosario caruso, ottobre 1932; conservato presso la biblioteca di storia patria per la sicilia orientale	30	34	stefania iannizzotto, alessandro de filippo	14852580	PDF
		manoscritto della tragedia lirica in due atti,					

# More screenshots...



**Modal Window**

View Edit Download

Replicas

[https://inaf-se-01.ct.pi2s2.it/dpm/ct.pi2s2.it/home/cometa/deroberto/busta01/029\\_la\\_lupa.tif](https://inaf-se-01.ct.pi2s2.it/dpm/ct.pi2s2.it/home/cometa/deroberto/busta01/029_la_lupa.tif)

[https://unipa-se-01.pa.pi2s2.it/dpm/pa.pi2s2.it/home/cometa/deroberto/busta01/029\\_la\\_lupa.tif](https://unipa-se-01.pa.pi2s2.it/dpm/pa.pi2s2.it/home/cometa/deroberto/busta01/029_la_lupa.tif)

[https://unict-dmi-se-01.ct.pi2s2.it/dpm/ct.pi2s2.it/home/cometa/deroberto/busta01/029\\_la\\_lupa.tif](https://unict-dmi-se-01.ct.pi2s2.it/dpm/ct.pi2s2.it/home/cometa/deroberto/busta01/029_la_lupa.tif)

View Edit Download

FileName:	029_la_lupa.tif
TypeID:	2
CategoryIDs:	
SubmissionDate:	2009-03-02 19:54:00
Description:	manoscritto della tragedia lirica in due atti, musicata da pierantonio tasca, pubblicata da officine tipografiche barravecchia e balestrini, palermo 1919; altre edizioni: noto, tipografia rosario caruso, ottobre 1932; conservato presso la biblioteca di storia patria per la sicilia orientale
Keywords:	verismo, federico de roberto, la lupa, giovanni verga, officine tipo-litografiche barravecchia e balestrini palermo, tipografia rosario caruso noto, società di storia patria per la sicilia orientale catania, manoscritti letterari moderni, la.mu.s.a., facoltà di lettere e filosofia, università degli studi di catania, società di storia patria per la sicilia orientale

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ScanQuality :	good	DocumentGenre :	tragedia lirica
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103 la lupa pierantonio tasca, pubblicata da officine tipo-litografiche barravecchia e balestrini, palermo 1919; altre edizioni: 30 34 rosario caruso noto, società di storia patria per la sicilia orientale 107433772 TIFF

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**ATTO PRIMO**

**Nell'ala  
sull'imbrunire.**

A destra la capanna dei mietitori, a sinistra una gran bica ed attrezzi rurali sparsi qua e là. In fondo, l'ampia distesa di messi, già velata dalla sera, e il corso sinuoso di un fiume palustre. S'odono passare in lontananza canzoni strascicate, il tintinnio dei campanacci delle mandre, abbayerare e di tanto in tanto l'uggiolare dei cani sparsi sulla quale scorrono delle folate di vento, con un fruscio maturo. Negli intervalli di silenzio sembra sorgere e diffondersi delle acque e il trillare dei grilli, incessante. La luna inaccessa, sbiancandosi man mano, in un alone afoso.

**SCENA I.**

**Bruno, Malerba, Neli, Grazia, contadini e contadine**  
dritti sulla paglia e su banchi di erba e cespugli  
intorno a **Filomena** che sta narrando

*Basta coi pianti!*  
*Mara (con passione, piangendo):* Sì... poi vedrete quando un'orfanello  
al mondo lascerà!..

*Nanni (furioso):* Maledetto sia Giuda! E proprio bella  
questa festa ch'io fo!

*Mara (amaramente):* Ed io? ed io?

*Nanni:* Non è ver!... Che intendi?

*Mara (c. s.):* E negate! negate!

*Nanni:* Non è vero!  
Che cosa hai visto, di?



# References



- Contact: [antonio.calanducci@ct.infn.it](mailto:antonio.calanducci@ct.infn.it),  
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# Questions



**Thank you for the attention**