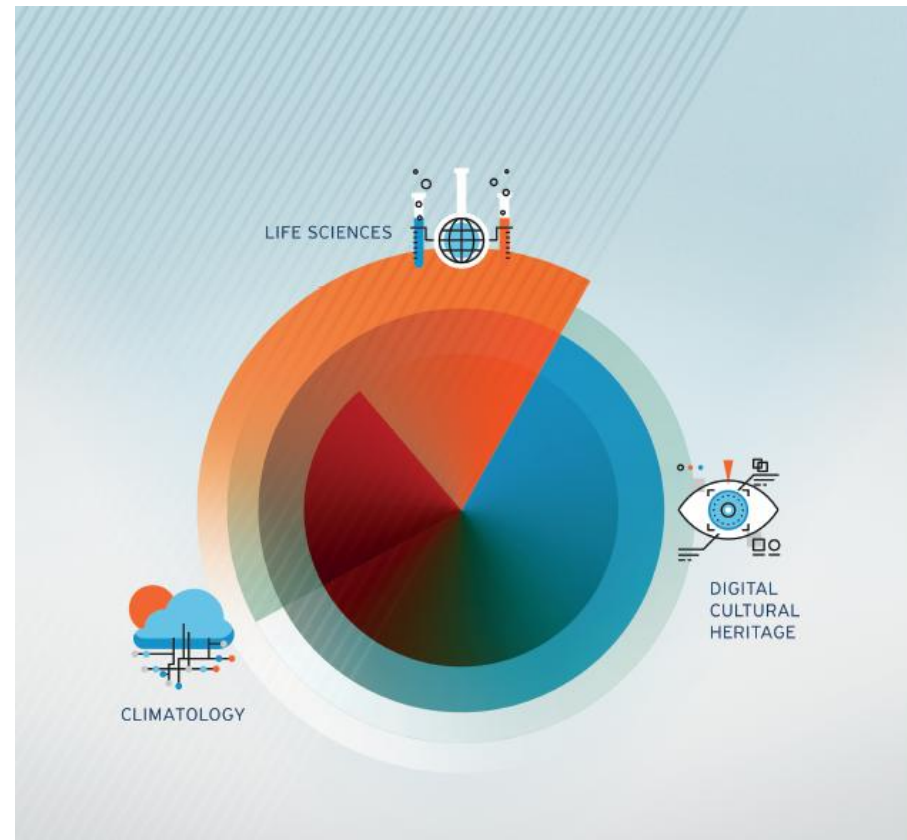


VRE for regional communities in Southeast Europe and the Eastern Mediterranean

**“Cross-continent collaboration
for advanced research”**
UbuntuNet-Connect 2017

Dr. Ognjen Prnjat



Administrative details

- ❑ VI-SEEM: Virtual Research Environment for regional interdisciplinary communities in Southeast Europe and the Eastern Mediterranean
- ❑ Start date 01/10/2015
- ❑ Duration 36 months

Participant no.	Participant organisation name	Part. short name	Country
1 (Coord)	GREEK RESEARCH AND TECHNOLOGY NETWORK S.A.	GRNET	Greece
2	THE CYPRUS INSTITUTE	Cyl	Cyprus
3	INSTITUTE OF INFORMATION AND COMMUNICATION TECHNOLOGIES – BULGARIAN ACADEMY OF SCIENCES	IICT-BAS	Bulgaria
4	INSTITUTE OF PHYSICS BELGRADE	IPB	Serbia
5	NATIONAL INFORMATION INFRASTRUCTURE DEVELOPMENT INSTITUTE	NIIF	Hungary
6	WEST UNIVERSITY OF TIMISOARA	UVT	Romania
7	POLYTECHNIC UNIVERSITY OF TIRANA	UPT	Albania
8	UNIVERSITY OF BANJA LUKA	UNI BL	Bosnia and Herzegovina
9	SS CYRIL AND METHODIUS UNIVERSITY OF SKOPJE	UKIM	FYR of Macedonia
10	UNIVERSITY OF MONTENEGRO	UOM	Montenegro
11	RESEARCH AND EDUCATIONAL NETWORKING ASSOCIATION OF MOLDOVA	RENAM	Moldova
12	INSTITUTE FOR INFORMATICS AND AUTOMATION PROBLEMS OF THE NATIONAL ACADEMY OF SCIENCES OF THE REPUBLIC OF ARMENIA	IIAP-NAS-RA	Armenia
13	GEORGIAN RESEARCH AND EDUCATIONAL NETWORKING ASSOCIATION	GRENA	Georgia
14	BIBLIOTHECA ALEXANDRINA	BA	Egypt
15	INTER UNIVERSITY COMPUTATION CENTER	IUCC	Israel
16	SYNCHROTRON-LIGHT FOR EXPERIMENTAL SCIENCE AND APPLICATIONS IN THE MIDDLE EAST	SESAME	Jordan

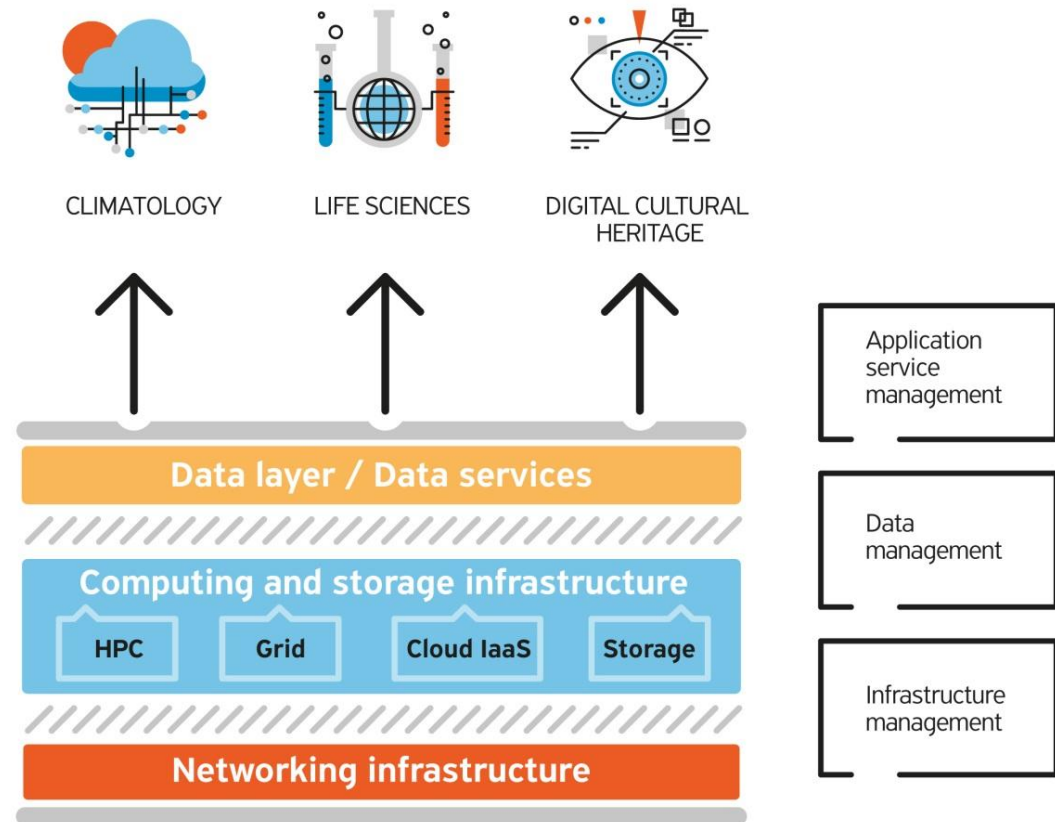
A continuing, integrative effort

- ❑ e-Infrastructure built over the last decade
- ❑ Targeting less developed EU countries, countries on path to accession and ENP
- ❑ Merging of SEE and EM regions
- ❑ SEE: network SEEREN1-2, Grid SEE-GRID-1/2/SCI, HPC HP-SEE
- ❑ EM: HPC LinkSCEEM1-2
- ❑ **Cross-continent collaboration!**
- ❑ Underlying connections via GEANT, ASREN, EaPConnect

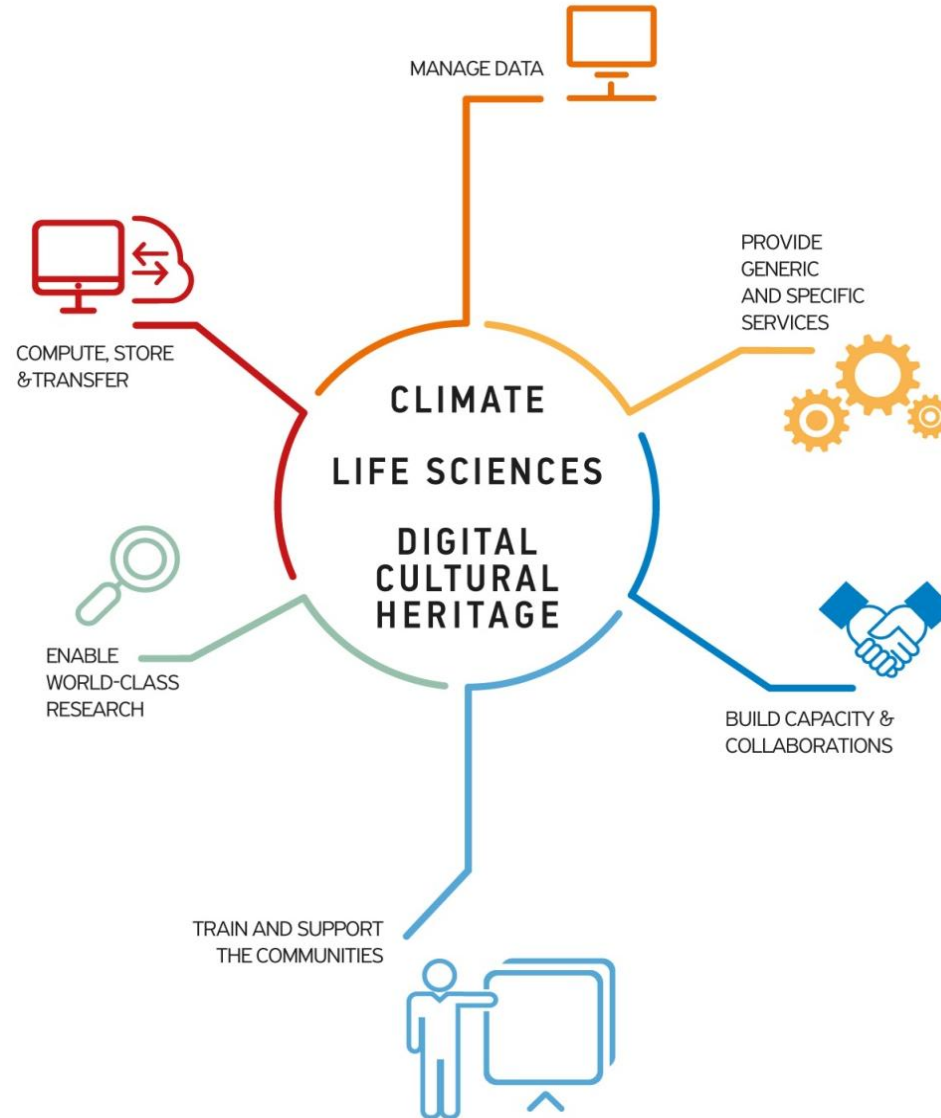


Overall objective

- ❑ Provide user-friendly integrated e-Infrastructure platform for Scientific Communities in Climatology, Life Sciences, and Digital Cultural Heritage for the SEEM region; by linking compute, data, and visualization resources, as well as services, software and tools.
- ❑ **Value added services on top of network**
- ❑ Diverse computing technologies
- ❑ Advent of big data / data services
- ❑ Service orientation



Covering the whole life-cycle of scientific research



Access to services - the service catalogue

- ❑ Service catalogue provides service discovery and contains all project services
 - ❑ Common services and resources operated by WP3
 - ❑ Storage/data services operated by WP4
 - ❑ Application-level services provided by WP5
- ❑ Designed to be compatible with the FitSM standards
- ❑ <https://services.vi-seem.eu/>
- ❑ 19 services grouped in 5 categories



Data Storage

-  VI-SEEM Data Discovery Service
-  VI-SEEM Archival Service
-  VI-SEEM Simple Storage
-  VI-SEEM Repository

Application Level

-  Subtract
-  ChemBioServer
-  [VI-SEEM Regional Community](#)




Datasets

-  VI-SEEM Live Access Server
-  AFMM
-  VI-SEEM Scientific Application

Environment

-  VI-SEEM Workflow, software tools repository
-  NANO-Crystal
-  DICOM
-  VI-SEEM Clowder


Compute

-  VI-SEEM Cloud
-  VI-SEEM HPC
-  VI-SEEM Grid

Authentication and Authorisation

-  VI-SEEM Login

Service provisioning

-  [VI-SEEM Service Portfolio Management System](#)

- ❑ Project e-Infrastructure
 - ❑ HPC sites – clusters and supercomputers (different hardware architectures)
 - ❑ Grid sites – interconnected via Grid middleware
 - ❑ Cloud sites – virtual machines (VMs) for services and distributed computing
 - ❑ Storage sites – short and long term storage
- ❑ Modern, state-of-the-art technologies for computing, virtualization and storage are made available to the scientific communities
- ❑ Overall infrastructure capacity
 - ❑ 23,744 CPU-cores, 1,012,736 GPU-cores, 20,496 Xeon Phi-cores
 - ❑ 3,112 Grid CPU-cores
 - ❑ 14,152 Cloud VM-cores
 - ❑ 18 PB of storage space

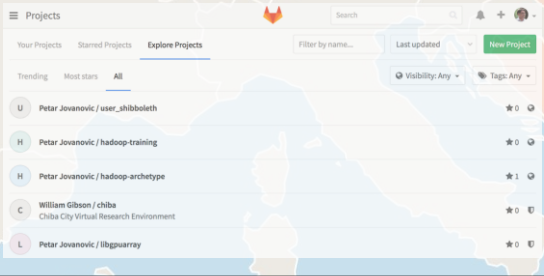
e-Infrastructure example - HPC sites



e-Infrastructure operations and resource management – collaborative effort

Code Repository, UoBL

<https://code.viseem.eu/>

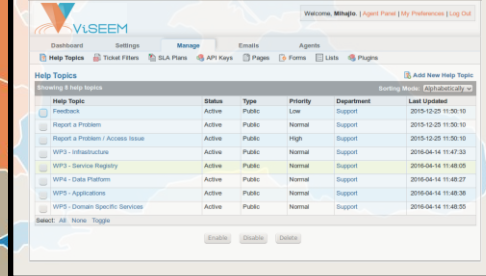


The screenshot shows a web interface for a code repository. It features a search bar, a 'New Project' button, and a list of projects. The projects listed include:

- Petar Jovanovic / user_shibboleth
- Petar Jovanovic / hadoop-training
- Petar Jovanovic / hadoop-archetype
- William Gibson / chiba
- Chiba City Virtual Research Environment
- Petar Jovanovic / libguarrey

Helpdesk, UoBL

<https://support.vi-seem.eu/>

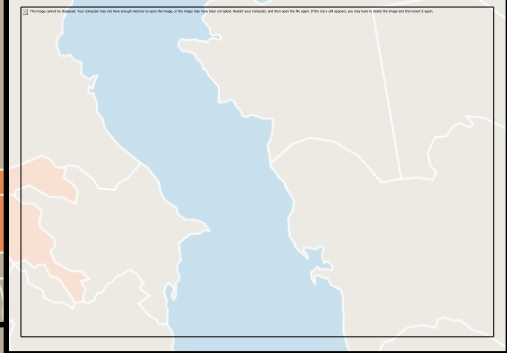


The screenshot shows a helpdesk interface with a table of help topics. The table has columns for Help Topic, Status, Type, Priority, Department, and Last Updated. The topics listed include:

Help Topic	Status	Type	Priority	Department	Last Updated
Feedback	Active	Public	Low	Support	2016-12-23 11:50:10
Report a Problem	Active	Public	Normal	Support	2016-12-23 11:50:10
Report a Problem / Access Issue	Active	Public	High	Support	2016-12-23 11:50:10
WPS - Infrastructure	Active	Public	Normal	Support	2016-04-14 11:47:33
WPS - Service Registry	Active	Public	Normal	Support	2016-04-14 11:48:05
WPS - Data Platform	Active	Public	Normal	Support	2016-04-14 11:48:27
WPS - Applications	Active	Public	Normal	Support	2016-04-14 11:48:38
WPS - Domain Specific Services	Active	Public	Normal	Support	2016-04-14 11:48:50

Accounting, ICT-BAS

<https://accounting.vi-seem.eu/>



The screenshot shows a web interface for accounting, featuring a map of Europe with several red markers indicating specific locations or data points.

GOCDB, UKIM

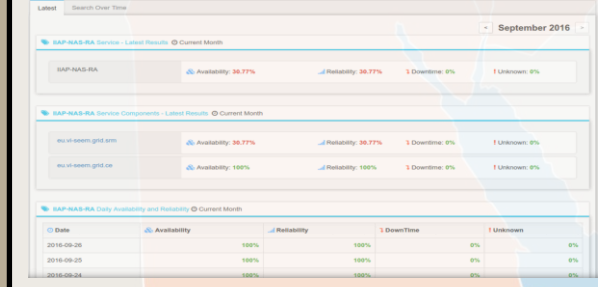
<https://gocdb.vi-seem.eu/>



The screenshot shows the GOCDB (Global Open Cloud Database) interface. It includes a 'Welcome to GOCDB' message, a search bar, and a map of Europe with red markers. The interface also displays user status and navigation options.

Monitoring, GRNET/UoBL

<https://mon.vi-seem.eu/>



The screenshot shows a monitoring dashboard for September 2016. It displays a table of service components with their availability, reliability, downtime, and unknown status percentages.

Service Component	Availability	Reliability	Downtime	Unknown
SAP-NAS-RA	36.77%	36.77%	0%	0%
SAP-NAS-RA Service Components				
eu.vi-seem.grid.ams	36.77%	36.77%	0%	0%
eu.vi-seem.grid.ce	100%	100%	0%	0%
SAP-NAS-RA Daily Availability and Reliability				
2016-09-26	100%	100%	0%	0%
2016-09-25	100%	100%	0%	0%
2016-09-24	100%	100%	0%	0%

Technical Wiki, CYI

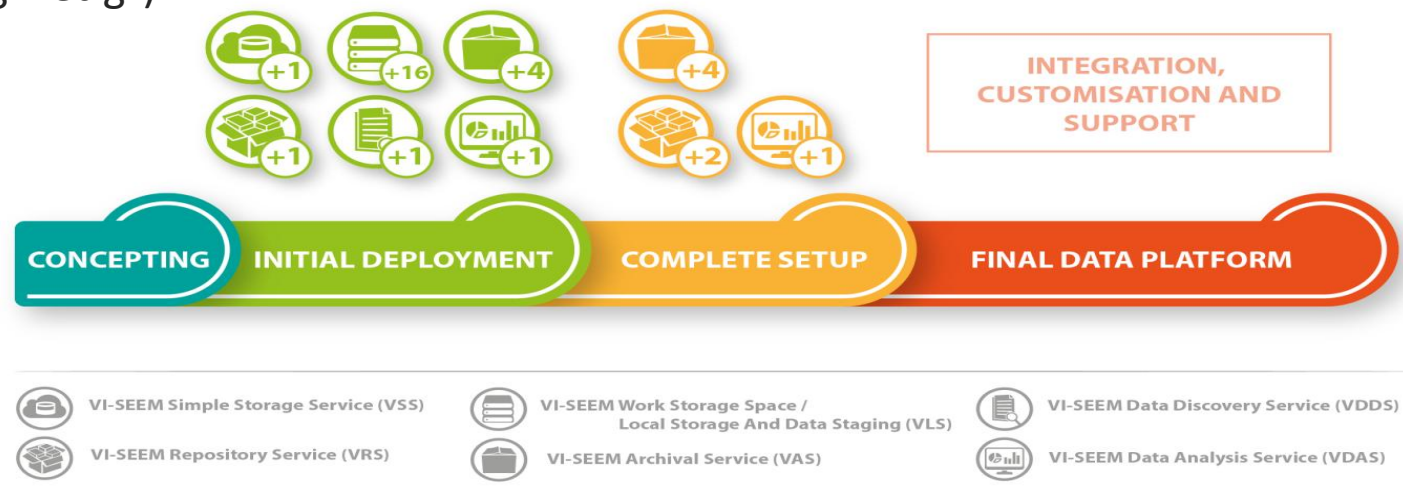
<https://wiki.vi-seem.eu/>



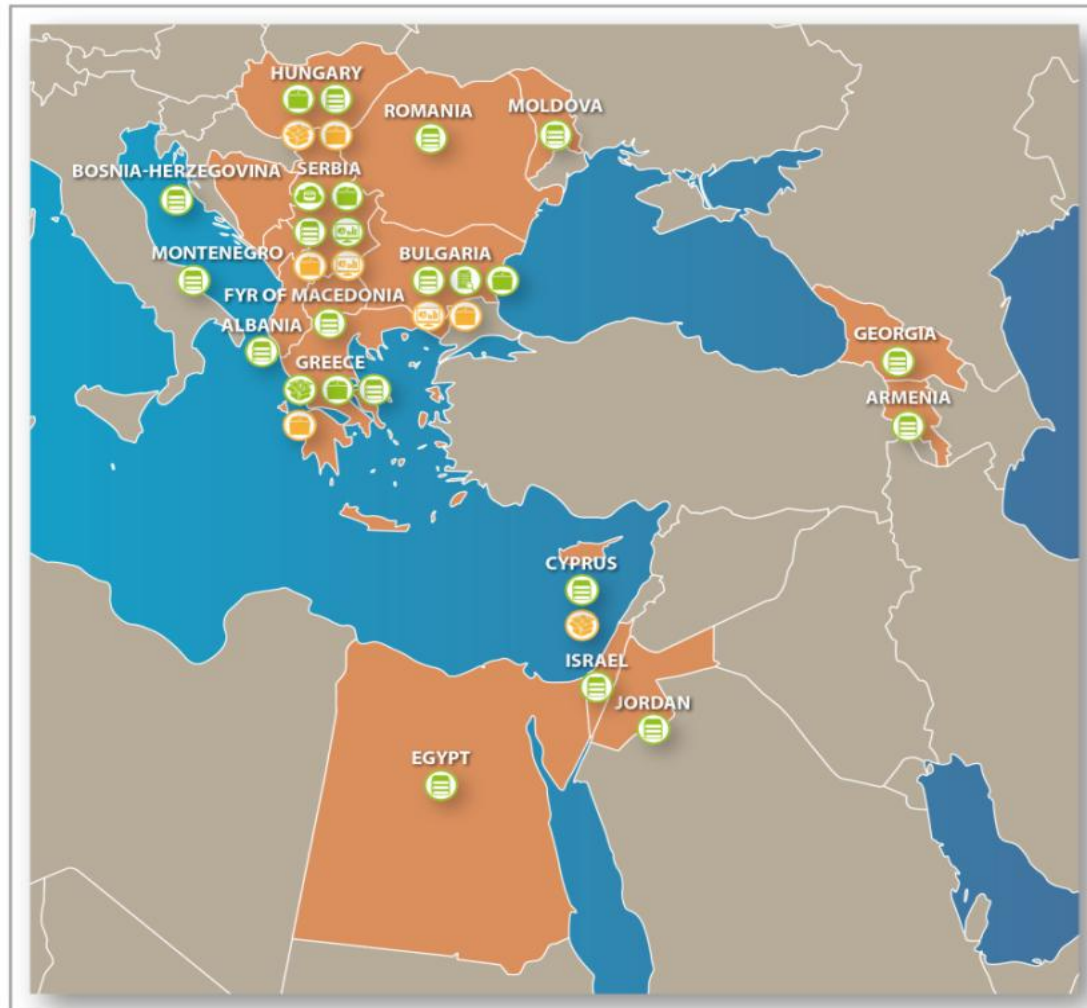
The screenshot shows a technical wiki interface, featuring a map of Europe with red markers, similar to the Accounting interface.

Data management services

- Functions allowing for data management for selected Scientific Communities, engage the full data management lifecycle
 - VSS – Simple Storage Service (simplestorage.vi-seem.eu)
 - VRS – Repository Service (repo.vi-seem.eu); integrated with PID service
 - VAS – Archival Service (deployed at 6 sites – GRNET, IPB, IICT-BAS, NIIF, IUCC, BA)
 - VLS – work storage space / local storage and data staging (at 12 sites)
 - VDDS – Data Discovery Service (search.vi-seem.eu)
 - VDAS – Data Analysis Service (hadoop.ipb.ac.rs)
 - PIDs (handle.grnet.gr)



Data management services – spread



 VI-SEEM Simple Storage Service (VSS)

 VI-SEEM Repository Service (VRS)

 VI-SEEM Work Storage Space /
Local Storage And Data Staging (VLS)

 VI-SEEM Archival Service (VAS)




 VI-SEEM Data Discovery Service (VDDS)

 VI-SEEM Data Analysis Service (VDAS)

SERVICES AVAILABLE FROM

 INITIAL DEPLOYMENT PHASE

 COMPLETE SETUP PHASE

- ❑ All services integrated through the user-facing VRE portal
- ❑ <https://vre.vi-seem.eu/>
- ❑ Organized per Scientific Community
 -  ❑ Climate SC
 -  ❑ Life Sciences SC
 -  ❑ Digital Cultural Heritage SC
- ❑ Access to VI-SEEM services and resources: Compute, Data, Domain-specific, Training
- ❑ Guidelines on how to contribute to
 - ❑ Applications
 - ❑ Workflows/codes
 - ❑ Datasets
 - ❑ Domain-specific services
- ❑ Domain-specific services integrated in the portal in a series of phases carried out by services enablers and user communities



The screenshot displays the Vi-SEEM Virtual Research Environment Portal. At the top, the logo and name 'Vi-SEEM Virtual Research Environment Portal' are visible. Below the header is a navigation bar with links for 'Home', 'Scientific Application Environment', 'Workflow, Pipeline, Software Tools', 'Regional Community Datasets', and 'Application-Level Services'. The main content area is divided into three sections:

- Virtual Communities:** This section features three community cards: 'Climate SC', 'Life Sciences SC', and 'Digital Cultural Heritage SC'. Each card includes an icon, the community name, and a list of services: 'Application-level Services', 'Datasets', 'Codes', 'Workflows', and 'Optimized applications and libraries'.
- Access to Vi-SEEM Resources:** This section contains three resource cards: 'Access to Compute Resources' (with a server icon), 'Access to Data Resources' (with a database icon), and 'Access to Vi-SEEM Training Portal' (with a group of people icon).
- Contribute to the Virtual Research Environment:** This section offers four contribution options: 'Contribute to Scientific Application Environment', 'Contribute Workflows and/or Codes', 'Contribute Datasets', and 'Contribute Application-level Services'.

At the bottom, there is a 'Details' section showing 'Hits: 6044' and navigation buttons for 'Prev' and 'Next'.

Domain-specific services

- ❑ VRE Scientific Application Environment
 - ❑ Optimized applications and libraries
 - ❑ Virtual Machine (VM) images
 - ❑ Codes from the three scientific communities
- ❑ Workflow, software tools repository
- ❑ Regional community datasets
- ❑ Application level services



- ❑ Climate
 - ❑ Live Access Server



- ❑ Digital Cultural Heritage
 - ❑ VI-SEEM Clowder
 - ❑ 3DINV
 - ❑ AUTOGR



- ❑ Life Sciences
 - ❑ ChemBioServer
 - ❑ AFMM
 - ❑ NANO-Crystal
 - ❑ Subtract



The screenshot displays the Vi-SEEM Virtual Research Environment Portal. At the top, the logo and title "Vi-SEEM Virtual Research Environment Portal" are visible. A navigation bar includes links for Home, Scientific Application Environment, Workflow, Pipeline, Software Tools, Regional Community Datasets, and Application-Level Services. The main content area is titled "Virtual Communities" and features three columns for different scientific domains: Climate SC, Life Sciences SC, and Digital Cultural Heritage SC. Each column contains a set of orange buttons for "Application-level Services", "Datasets", "Codes", "Workflows", and "Optimized applications and libraries". Below this, the "Access to Vi-SEEM Resources" section offers three options: "Access to Compute Resources", "Access to Data Resources", and "Access to Vi-SEEM Training Portal". The "Contribute to the Virtual Research Environment" section includes four buttons: "Contribute to Scientific Application Environment", "Contribute Workflows and/or Codes", "Contribute Datasets", and "Contribute Application-level Services". At the bottom, a "Details" section shows "Hits: 6044" and navigation buttons for "Prev" and "Next".

Application-level service flagships

- Climate

- Live Access Server



- Digital Cultural Heritage

- VI-SEEM Clowder



- Life Sciences

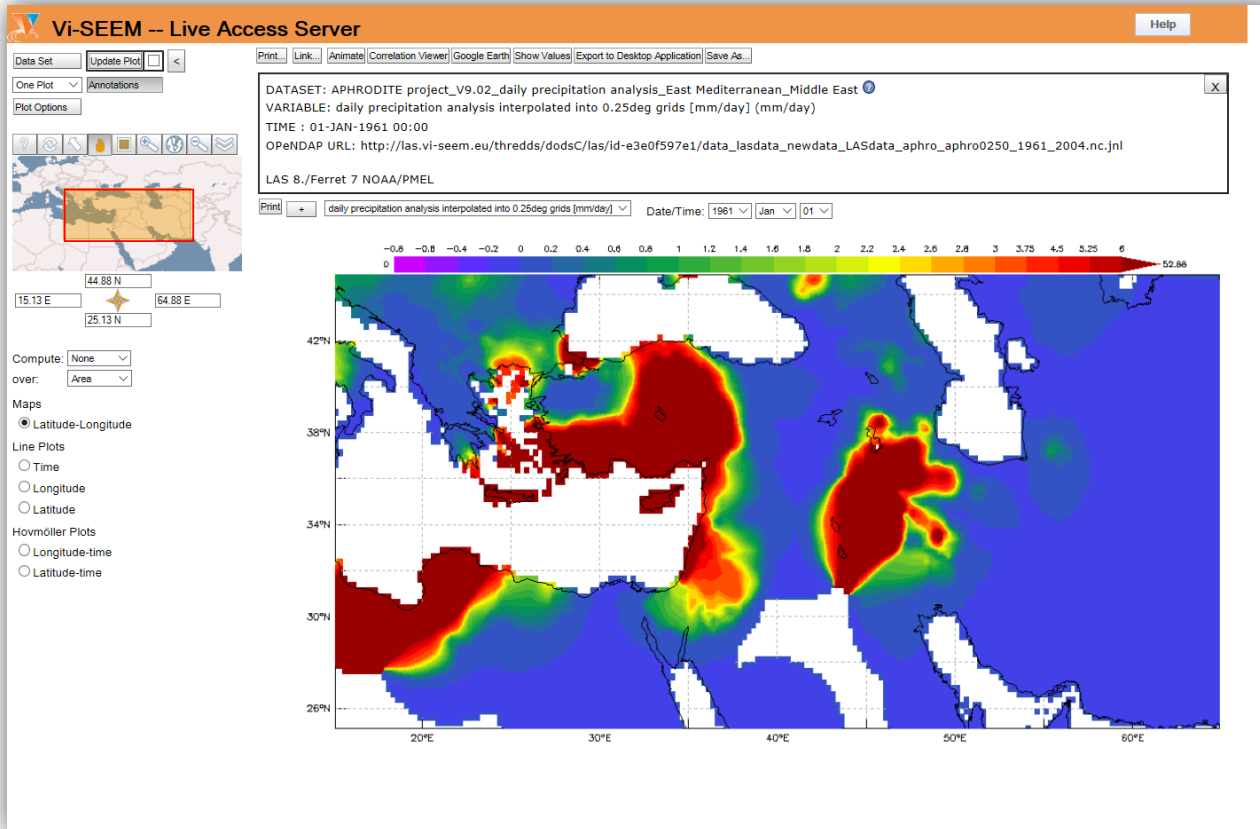
- ChemBioServer



Live Access Server

<http://las.vi-seem.eu/las>

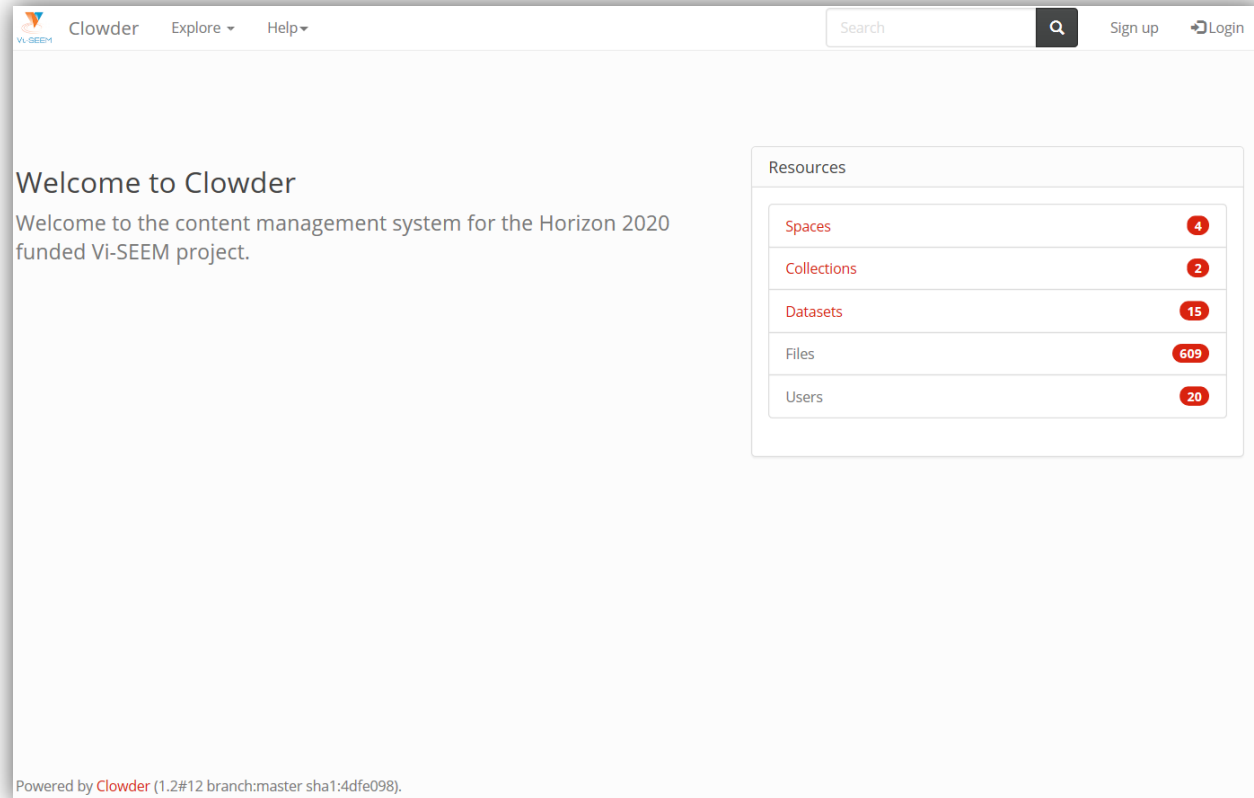
A web server providing flexible access to geo-referenced scientific data, offering visualization & post-processing capabilities for climate data



□ VI-SEEM Clowder

<http://dchrepo.vi-seem.eu/>

A Digital Culture Heritage repository which also offers integrated interactive visualization tools



The screenshot shows the Clowder web interface. The top navigation bar includes the Clowder logo, "Explore" and "Help" dropdown menus, a search bar, and "Sign up" and "Login" links. The main content area displays a "Welcome to Clowder" message, stating it is a content management system for the Horizon 2020 funded Vi-SEEM project. On the right side, there is a "Resources" section with a table listing various metrics:

Resource	Count
Spaces	4
Collections	2
Datasets	15
Files	609
Users	20

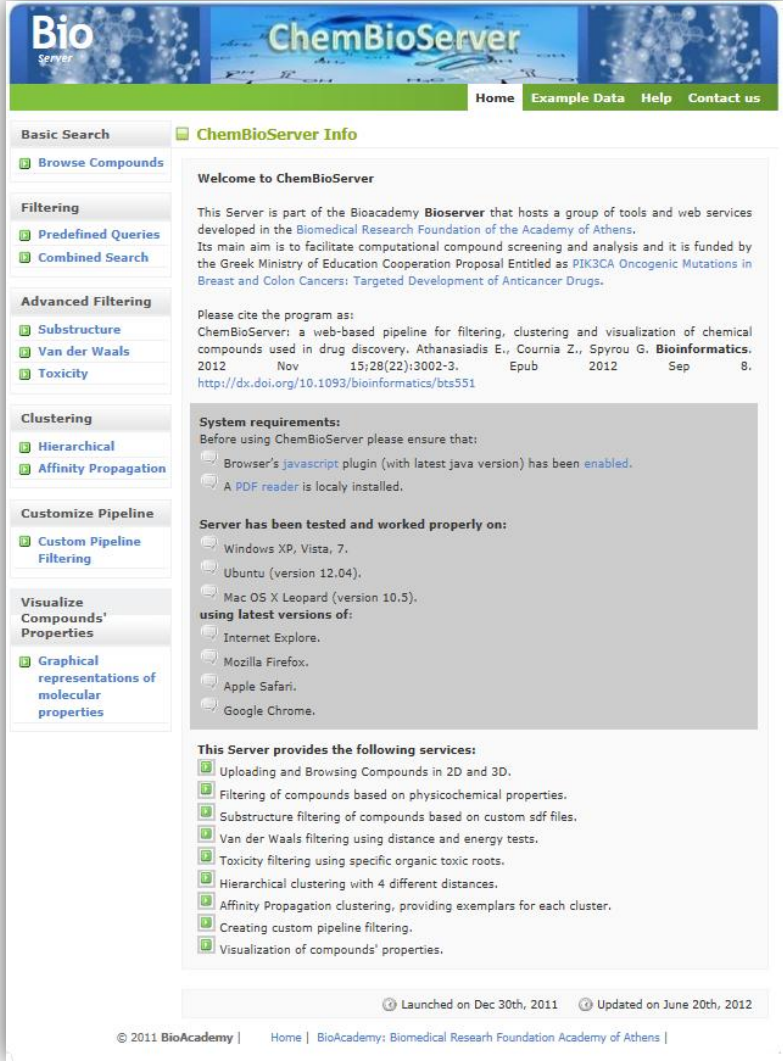
At the bottom of the page, it states "Powered by Clowder (1.2#12 branch:master sha1:4dfe098)." The footer of the slide contains the text "<Event Name>" on the left and the number "16" on the right.

ChemBioServer

<http://bioserver-3.bioacademy.gr>

[/Bioserver/ChemBioServer/](http://Bioserver/ChemBioServer/)

A web-based pipeline for filtering, clustering and visualization of chemical compounds used in drug discovery



The screenshot shows the ChemBioServer website interface. The header includes the 'Bio Server' logo and 'ChemBioServer' title, with navigation links for Home, Example Data, Help, and Contact us. The main content area is divided into two columns. The left column contains a 'Basic Search' section with a 'Browse Compounds' button, followed by 'Filtering' options (Predefined Queries, Combined Search), 'Advanced Filtering' (Substructure, Van der Waals, Toxicity), 'Clustering' (Hierarchical, Affinity Propagation), 'Customize Pipeline' (Custom Pipeline Filtering), and 'Visualize Compounds' Properties' (Graphical representations of molecular properties). The right column features a 'ChemBioServer Info' section with a 'Welcome to ChemBioServer' message, a description of the server's purpose and funding, a citation request, and system requirements. The system requirements section lists supported operating systems (Windows XP, Vista, 7; Ubuntu 12.04; Mac OS X Leopard 10.5) and browsers (Internet Explorer, Mozilla Firefox, Apple Safari, Google Chrome). A list of services provided by the server is also shown, including uploading and browsing compounds, filtering based on physicochemical properties, substructure filtering, Van der Waals filtering, toxicity filtering, hierarchical clustering, affinity propagation clustering, custom pipeline filtering, and visualization of compound properties. The footer includes copyright information for BioAcademy (© 2011) and the Biomedical Research Foundation of the Academy of Athens, along with launch and update dates (Launched on Dec 30th, 2011; Updated on June 20th, 2012).

- ❑ Defined the framework for accessing VI-SEEM services and resources
- ❑ Opened up the VRE to the widest possible regional communities
- ❑ Uses a fair, transparent and trusted mechanism for allocation of VRE resources
- ❑ Facilitates access and deployment of new applications in the VRE
- ❑ 3 calls envisaged
- ❑ 40+ applications have been allocated resources
- ❑ Scientific support also provided

Access to the VRE - application areas

- ❑ Modeling and Molecular Dynamics (MD) study of important drug targets
- ❑ Computer-aided drug design
- ❑ Analysis of Next Generation DNA sequencing data
- ❑ Synchrotron data analysis
- ❑ Image processing for biological applications

- ❑ Regional climate modelling to better understand and predict climate change and impacts, and phenomena such as dust storms.
- ❑ Air quality modelling, including atmospheric chemistry and air pollution transport.
- ❑ Weather forecast and extreme weather prediction, model development, application.

- ❑ Online services and access to repositories in order to enable studies of the immense cultural heritage assets in the region (e.g., searchable digital libraries; with support of meta-data and OCR for Latin characters).
- ❑ Online visualization tools and data management systems to drive breakthrough contributions to art historical problems (e.g., interactive visualization viewer of RTi files and 3D models with digital libraries integration).
- ❑ Unsupervised feature learning in photogrammetric techniques, data processing for image classification; semantic referencing; and geo-referencing.

- ❑ 23 project applications, 21 accepted
 - ❑ 11 in Climatology
 - ❑ 5 in Digital Cultural Heritage
 - ❑ 5 in Life Sciences
- ❑ 10 different countries of the region
- ❑ 14 of the applications required HPC services
- ❑ 6 required Grid and Cloud services
- ❑ 12 required storage services
- ❑ 8 required application specific services
- ❑ Per-country distribution: Bosnia and Herzegovina: 1, Bulgaria: 6, Cyprus: 3, FYR of Macedonia: 2, Georgia: 1, Greece: 4, Montenegro: 1, Israel: 1, Romania: 1, Serbia: 1.
- ❑ 14M CPU core hours, 3.4M GPU core hours, 1M Phi core hours provided

- ❑ Call Opened in May 2017 with deadline June 2017
- ❑ 14 Services made available to users
- ❑ In total 15 million CPU core hours, 370 million GPU core hours and 15 million Phi core hours are available
- ❑ Targeted research fields
 - ❑ 5 areas in Life Sciences
 - ❑ 3 areas in Climate Research
 - ❑ 3 areas in Digital Cultural Heritage
- ❑ 18 applications have been received
 - ❑ 7 in Life Sciences
 - ❑ 5 in Climate Research
 - ❑ 6 in Digital Cultural Heritage








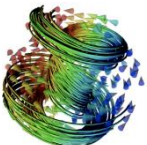
Training, dissemination, marketing, innovation

- Content-rich platform for communication within the VRE community and beyond
 - Main web page, VRE portal, training portal, wiki
 - Agenda system, document repository system
- VI-SEEM marketing activities
 - Newsletters, popular articles, promotional materials, focused meeting and events for various types of audiences (SMEs, museums, universities, institutes, etc.), seminars and tours for students
- Events organized
 - 7 national dissemination events
 - 7 national training events
 - 3 regional training events
- 26 external events where project presented
- 25 papers
- 9 innovative developments



The collage features several key elements:

- Virtual Research Environment Diagram:** A circular diagram with segments for 'COMPUTE', 'DATA STORAGE', 'DATA SETS', 'SCIENTIFIC APPLICATION ENVIRONMENT', and 'APPLICATION SPECIFIC SERVICES'. Below it are icons for 'QUANTOLOGY', 'LIFE SCIENCES', and 'DIGITAL CULTURAL HERITAGE'.
- Website Screenshot:** Shows the Vi-SEEM website with navigation links for 'VIRTUAL RESEARCH COMMUNITIES', 'SERVICES', 'INFRASTRUCTURE', 'EVENTS & TRAINING', and 'NEWS'. It includes buttons for 'Visit the Vi-SEEM Training Portal' and 'Join the Virtual Research Environment'.
- Activity List:**
 - 1. Special System 'Infrastucture for Scientific Evaluation' (ISE) 6/30/2017, 4-8 July (Ondrej, Republic of Macedonia) March 1, 2017
 - 1. Special Conference of the European Commission for Promoting the Application of Mathematics in Science and Natural Sciences, Athens, Bulgaria June 01-06, 2017 March 1, 2017
 - 1. Special System 'HPC and Digital Algorithms and Applications' (LOST) June 03-05, 2015, Slovakia, Banská March 1, 2017
 - 1. Vi-SEEM Interdisciplinary Regional Training and PRACE 2017 Spring School, organized by the Centre for Research and Innovation (CRI) 2015, Slovakia, Copernic February 24, 2017
 - 1. Vi-SEEM Digital Cultural Heritage Regional Training, 4-8 February 2017, Alexandria, Egypt January 19, 2017
- Twitter Feed:** Shows tweets from @Vi_SEEM, @PRACE, and @infrastructure, discussing the project's goals and activities.
- Footer:** Includes the Vi-SEEM logo, project management office contact info, and the European Union Horizon 2020 logo.

- ❑ VI-SEEM Training Portal
- ❑ Access via: <https://training.vi-seem.eu/>
 - ❑ Storage services
 - ❑ Domain-specific software and tools
 -  ❑ Climate
 -  ❑ Digital Cultural Heritage
 -  ❑ Life Sciences
 - ❑ HPC 
 - ❑ Cloud 
 - ❑ Data 
 - ❑ Grid 
 - ❑ Scientific visualization 



- ❑ A case study on regional shared value-added services
 - ❑ A VRE for the scientific user communities in 3 domains
 - ❑ Integrated platform bringing together computing, data management and domain-specific services
 - ❑ Services listed in the Service Catalogue and provided through the VRE Portal
 - ❑ Support the full lifecycle of scientific research
 - ❑ User-centric view
 - ❑ Open calls for access, peer review
- ❑ African community can benefit from this example of common technical and scientific cross-border endeavor
- ❑ We would like to help Africa-Connect, UbuntuNet and NRENs add value-added services on top of the network
- ❑ We are supportive of collaborations with African scientists from the target scientific fields.

We cherish our community and want to enlarge it!



Thanks!



 <https://vi-seem.eu>

 @vi_seem

 VI-SEEM

 vi-seem-pmo@vi-seem.eu

