

The Collaborative SiMulation Metadata Management CoSiMM v2.0

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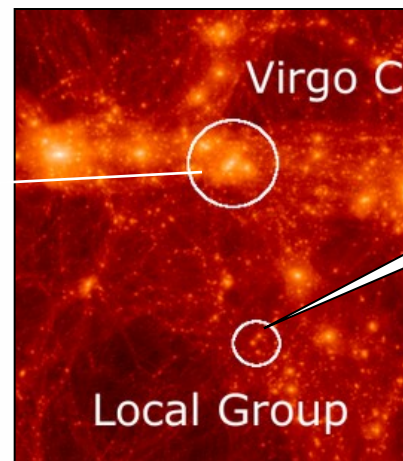
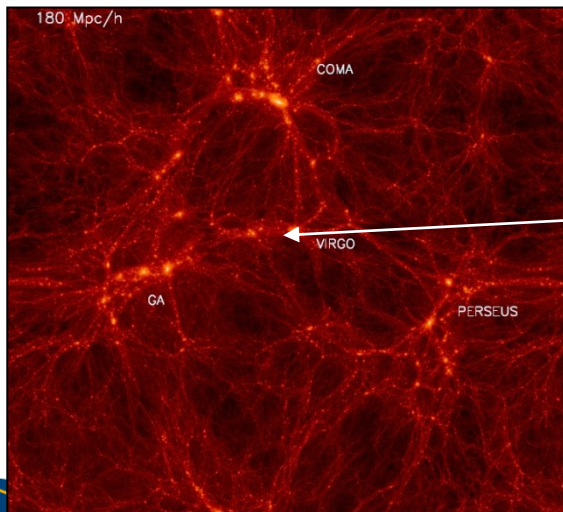
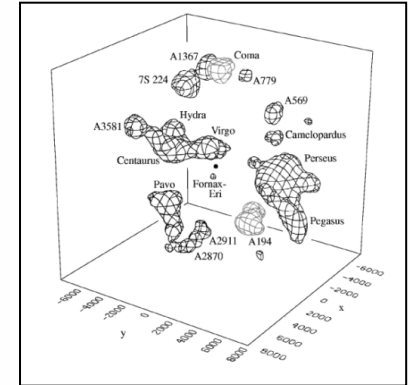
AG Tagung, Heidelberg 2011

Outline

- CLUES
 - VRE for CLUES
- CoSiMM
 - Basic strtructure
 - CoSiMM API
 - Security model
- CoSiMM Web
- Elastic Cloud model

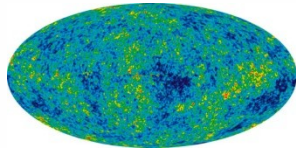
CLUES: Introduction

- **Constrained Local Universe Simulations**
- >40 scientists from > 10 countries
- reproduce local universe:
 - cosmological simulations
 - constrained initial conditions
- Explore galaxy formation problem.

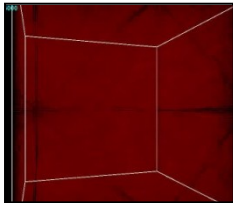


MW

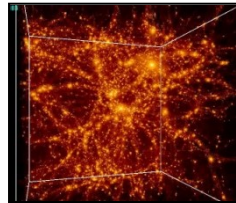
CLUES Workflow



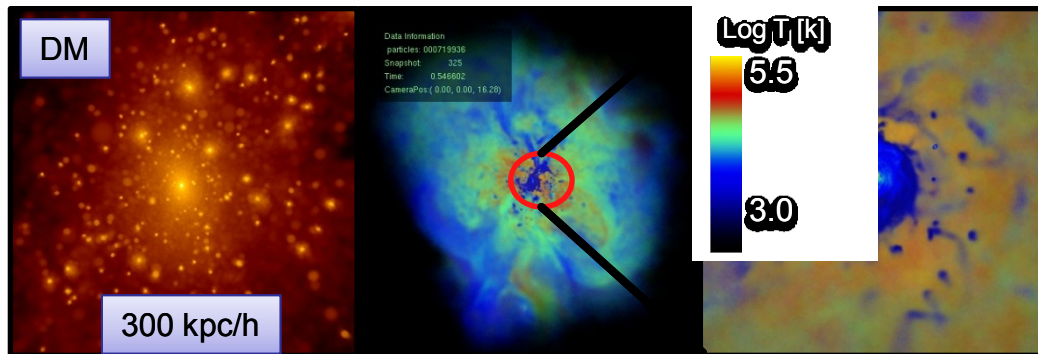
CMB+other ingredients



simulation snapshots



computer cluster



the model:
initial conditions

run the
simulation

store data

>10MCPUh

analyse

compare with
observations

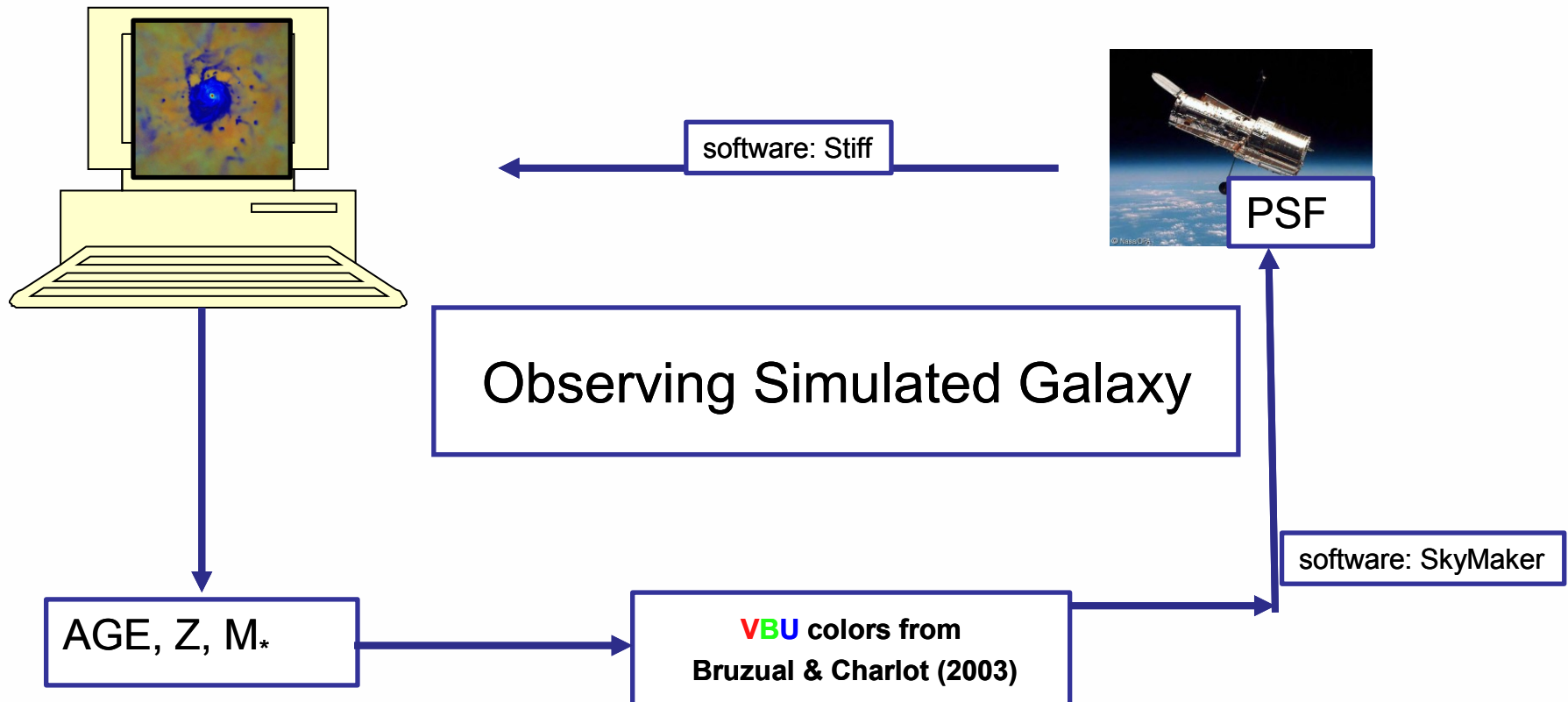
share results

publish results

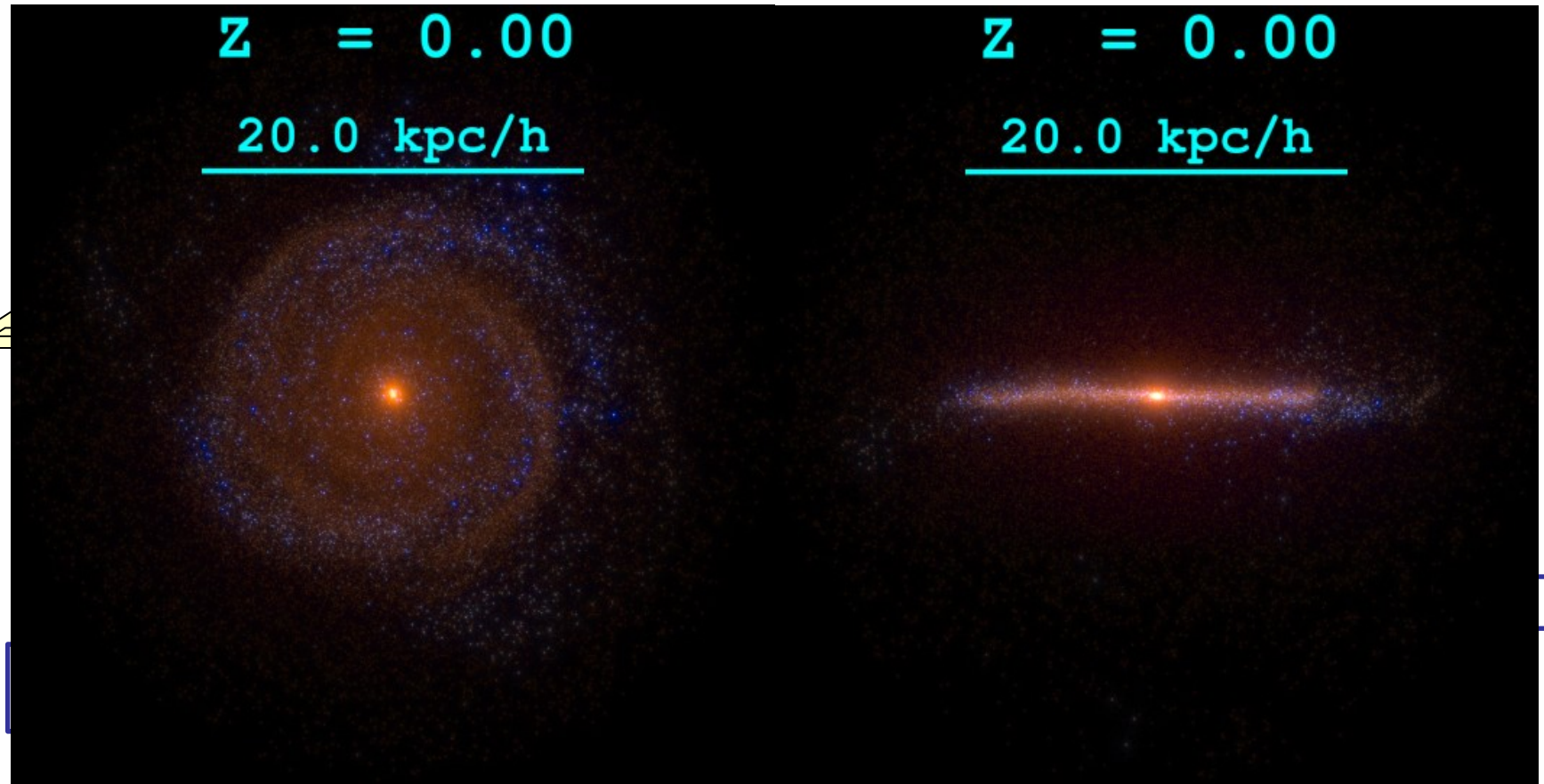
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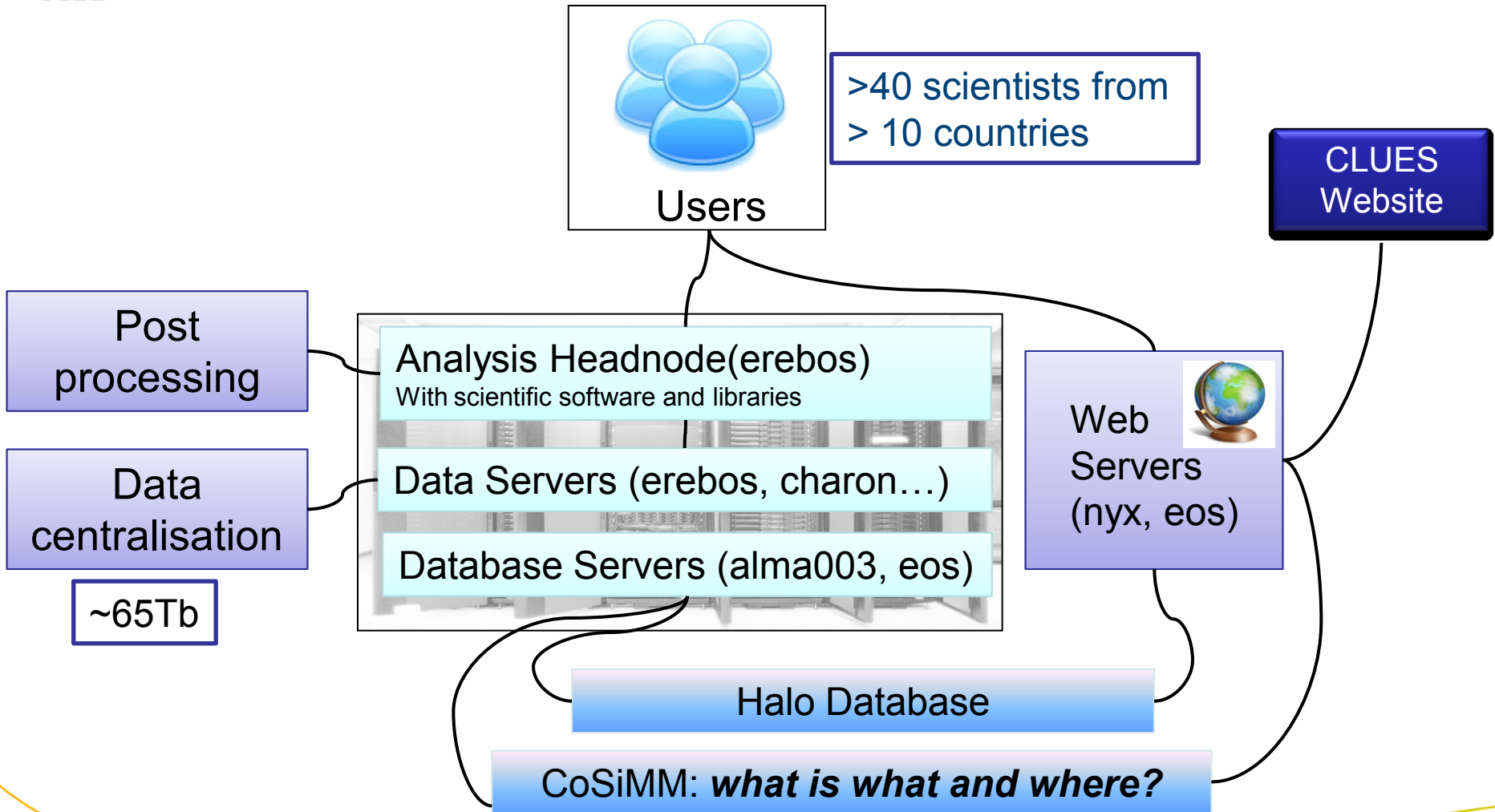
Example: One click Analysis?



Example: One click Analysis?



Current VRE for CLUES

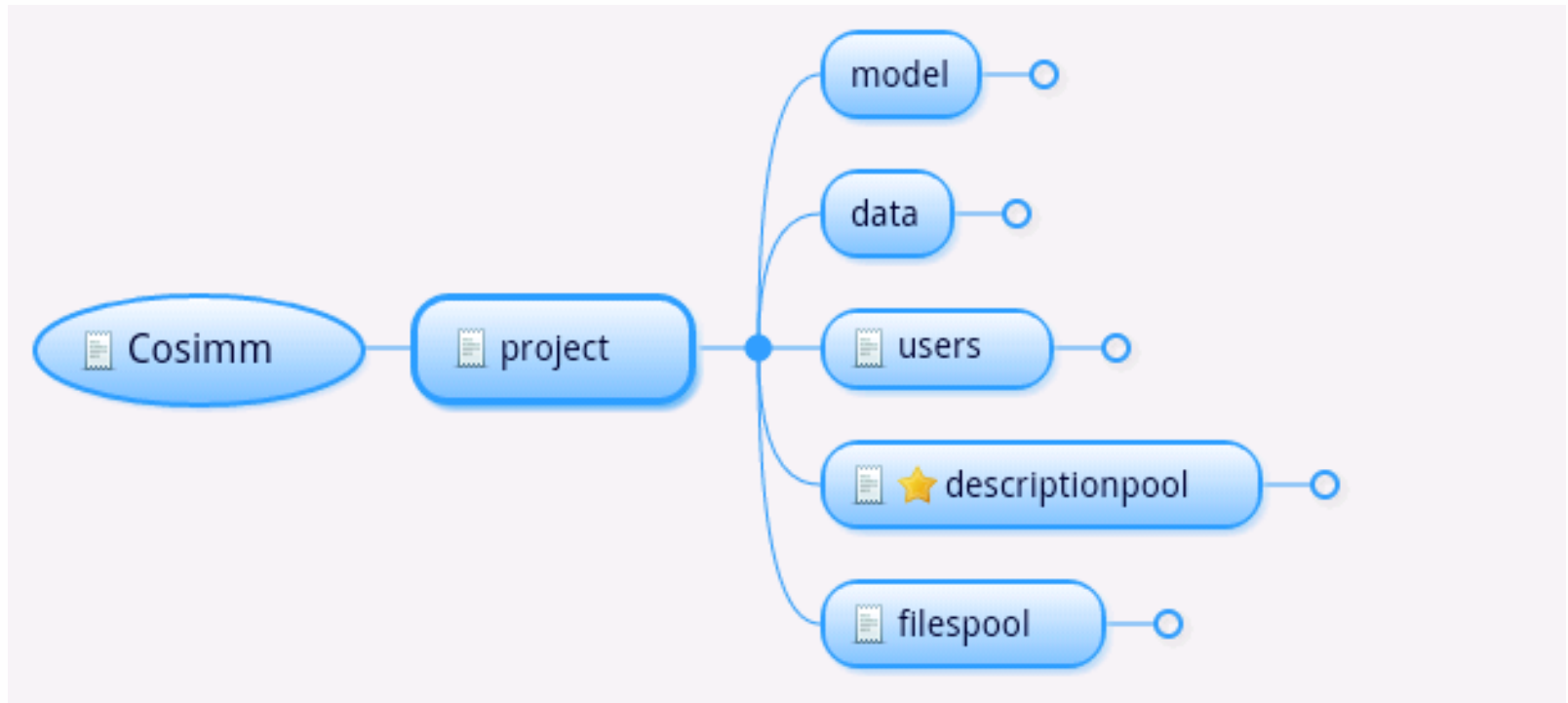




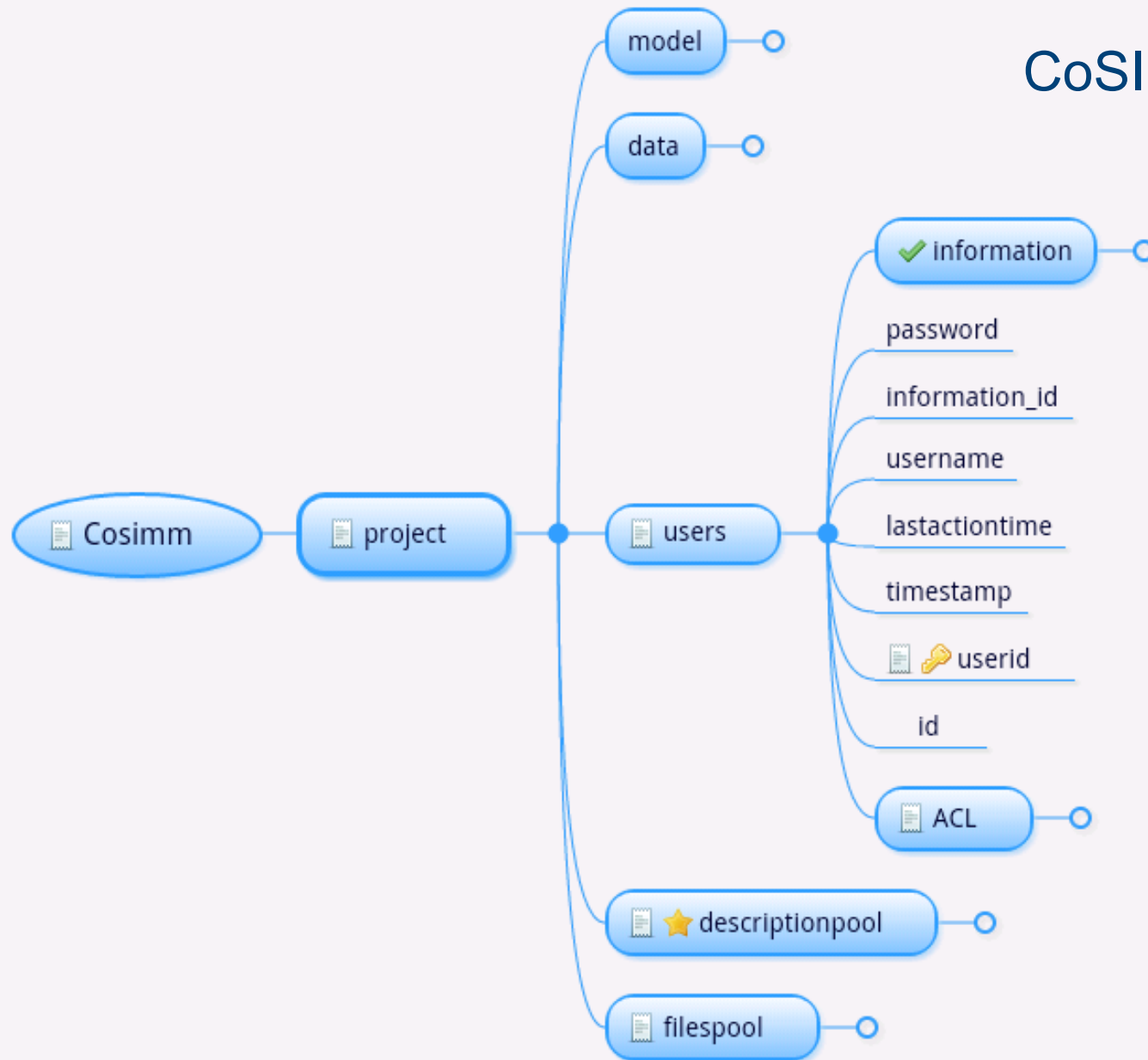
COSIMM v2.0: Goals

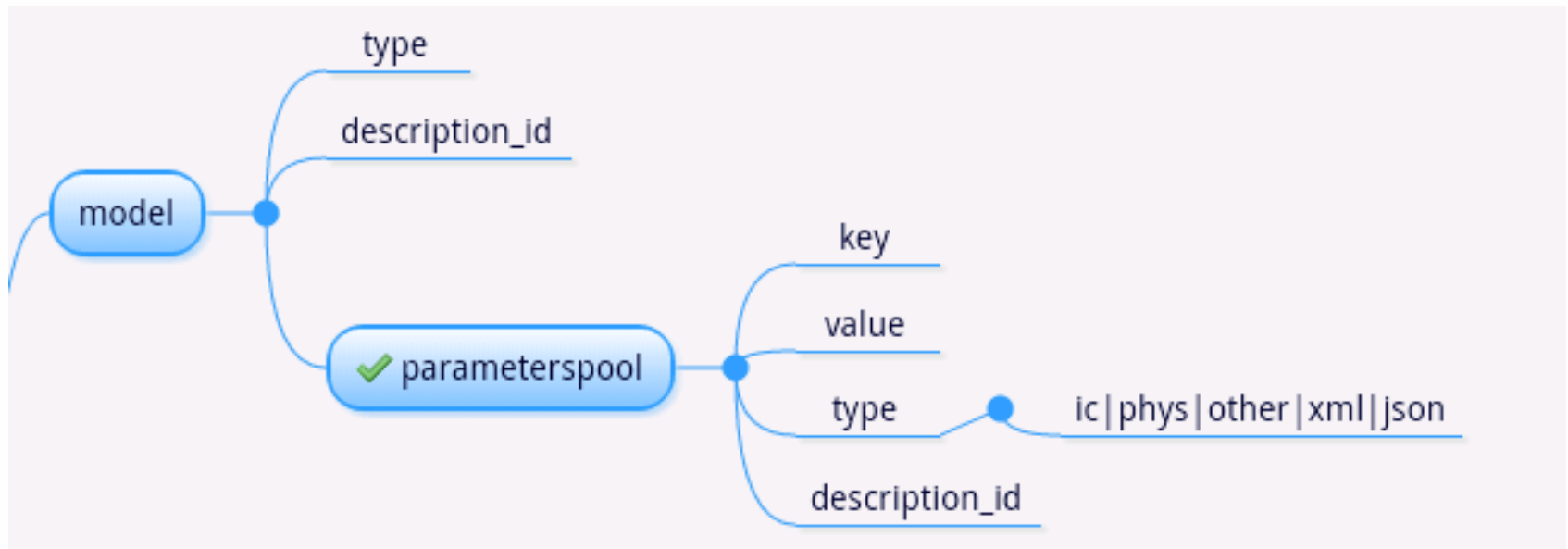
- CoSiMM is a pilot project for:
 - Standardizing data bookkeeping in CLUES
 - makes data exchange easy
 - simplifies collaboration between group members and groups
 - Access Control List (ACL) Security layer is one of the key features(introduced **with v2.0**)
 - Should be extendable and simple to manage
 - Self consistent framework: COSIMM-Web
 - Open Source software in use: PHP/MySQL/Apache

CoSIMM Diagram

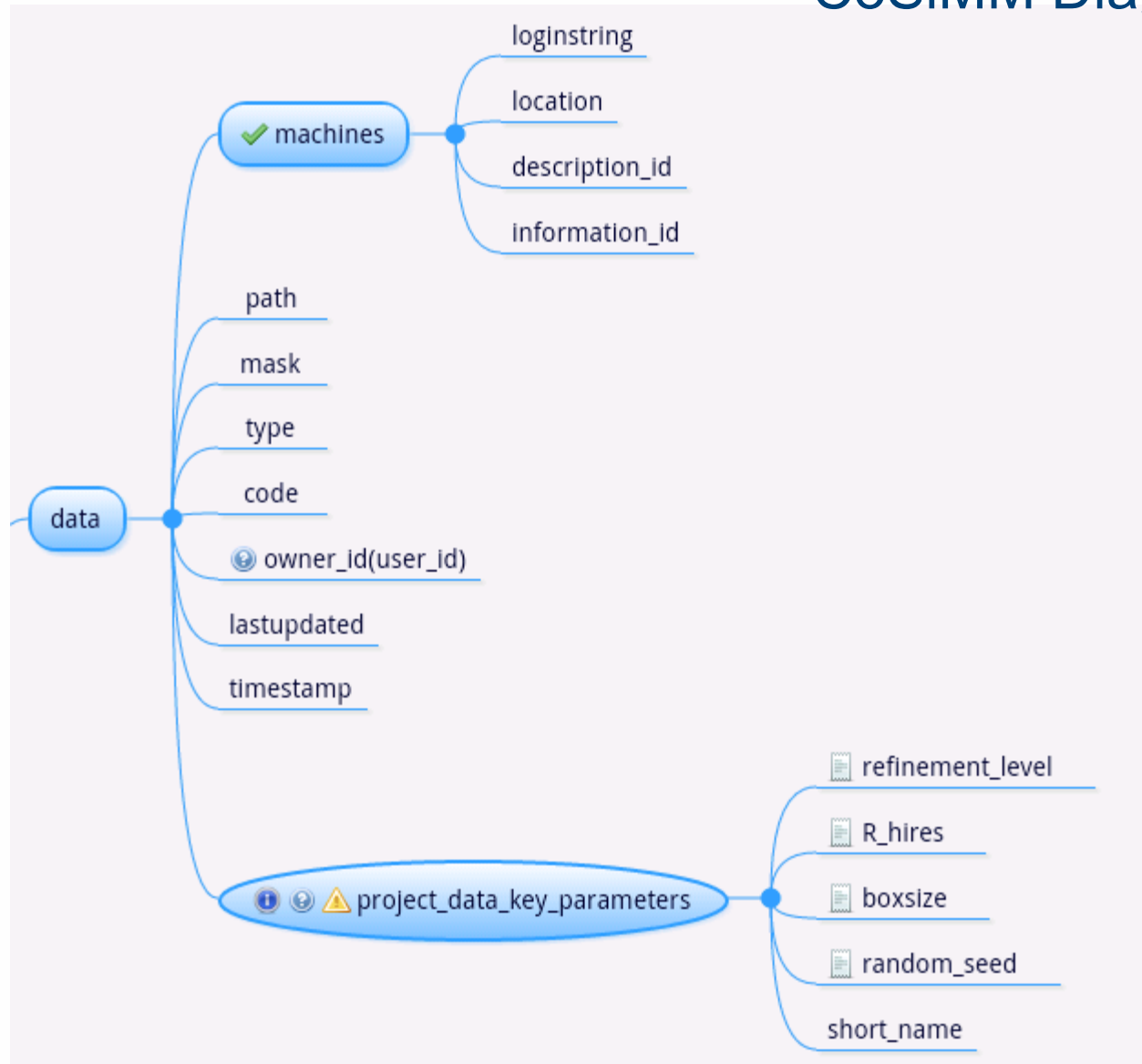


CoSIMM Diagram

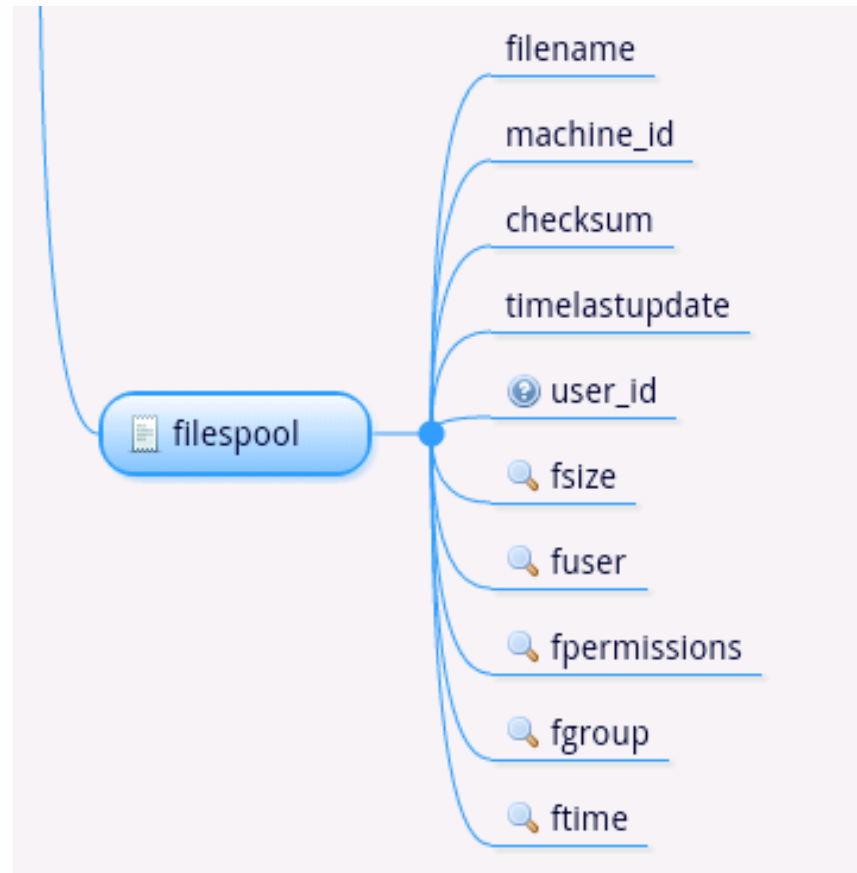




CoSiMM Diagram



CoSIMM Diagram



CoSiMM: Tables

c_project
id INT(11)
name VARCHAR(128)
description_id INT(11)
Indexes

c_parameter
id INT(11)
key INT(11)
value VARCHAR(128)
namespace VARCHAR(64)
description_id INT(11)
type ENUM(...)
Indexes

c_data
id INT(11)
path VARCHAR(20)
mask INT(11)
type VARCHAR(20)
code_id INT(11)
owner_id INT(11)
lastupdated INT(11)
timestamp INT(11)
parameters_id INT(11)
Indexes

c_file
id INT(11)
machine_id INT(11)
filename VARCHAR(256)
checksum VARCHAR(20)
lastupdate INT(11)
user_id INT(11)
fsize INT(11)
fuser VARCHAR(20)
fpermission INT(11)
fgroup VARCHAR(20)
fime INT(11)
Indexes

c_description
id INT(11)
type VARCHAR(4)
val MEDIUMTEXT
key INT(11)
Indexes

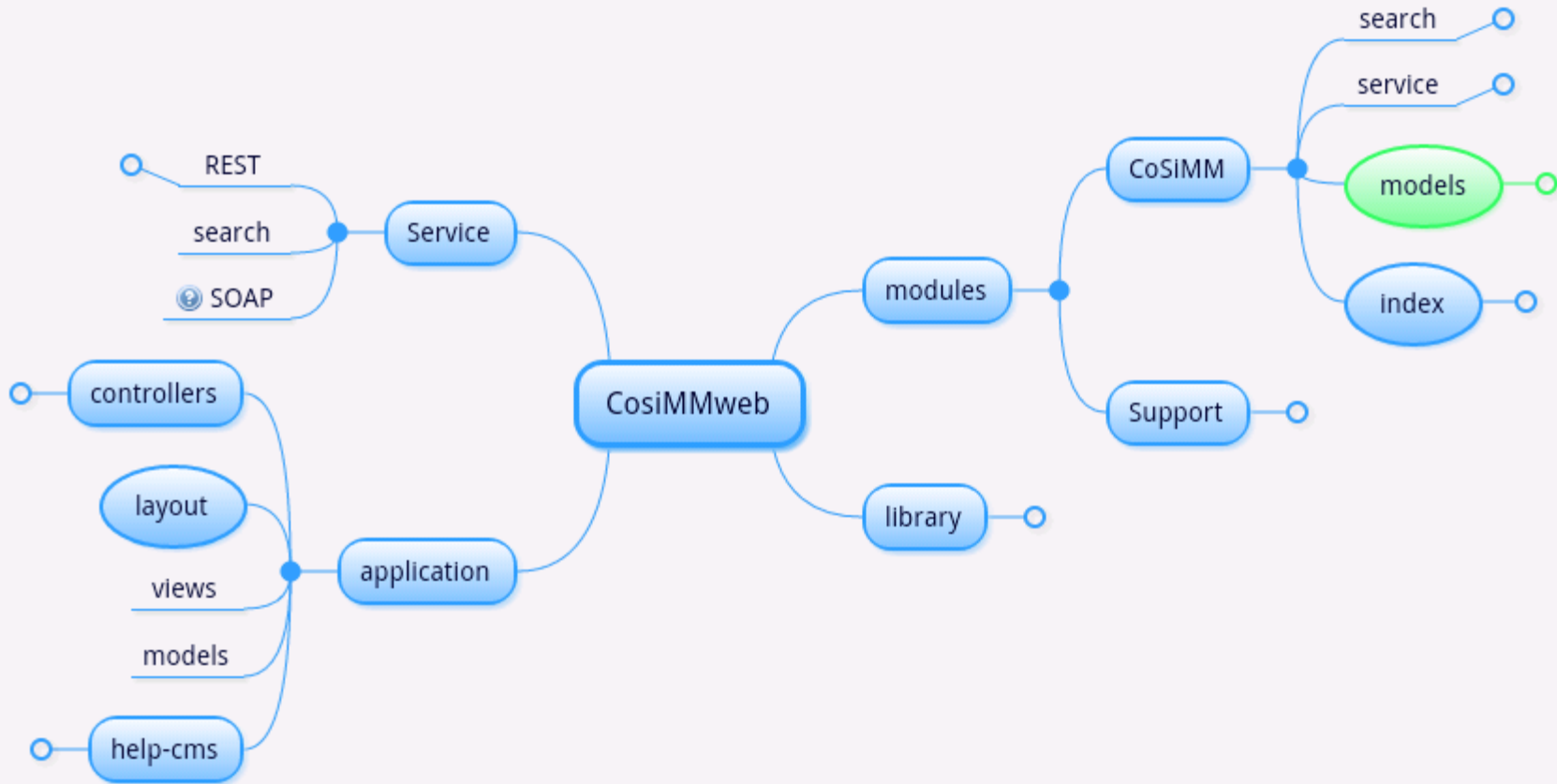
c_acl
id INT(11)
role VARCHAR(20)
privilege VARCHAR(20)
resource VARCHAR(20)
Indexes
PRIMARY

c_model
id INT(11)
parameter_id INT(11)
description_id INT(11)
type VARCHAR(20)
Indexes

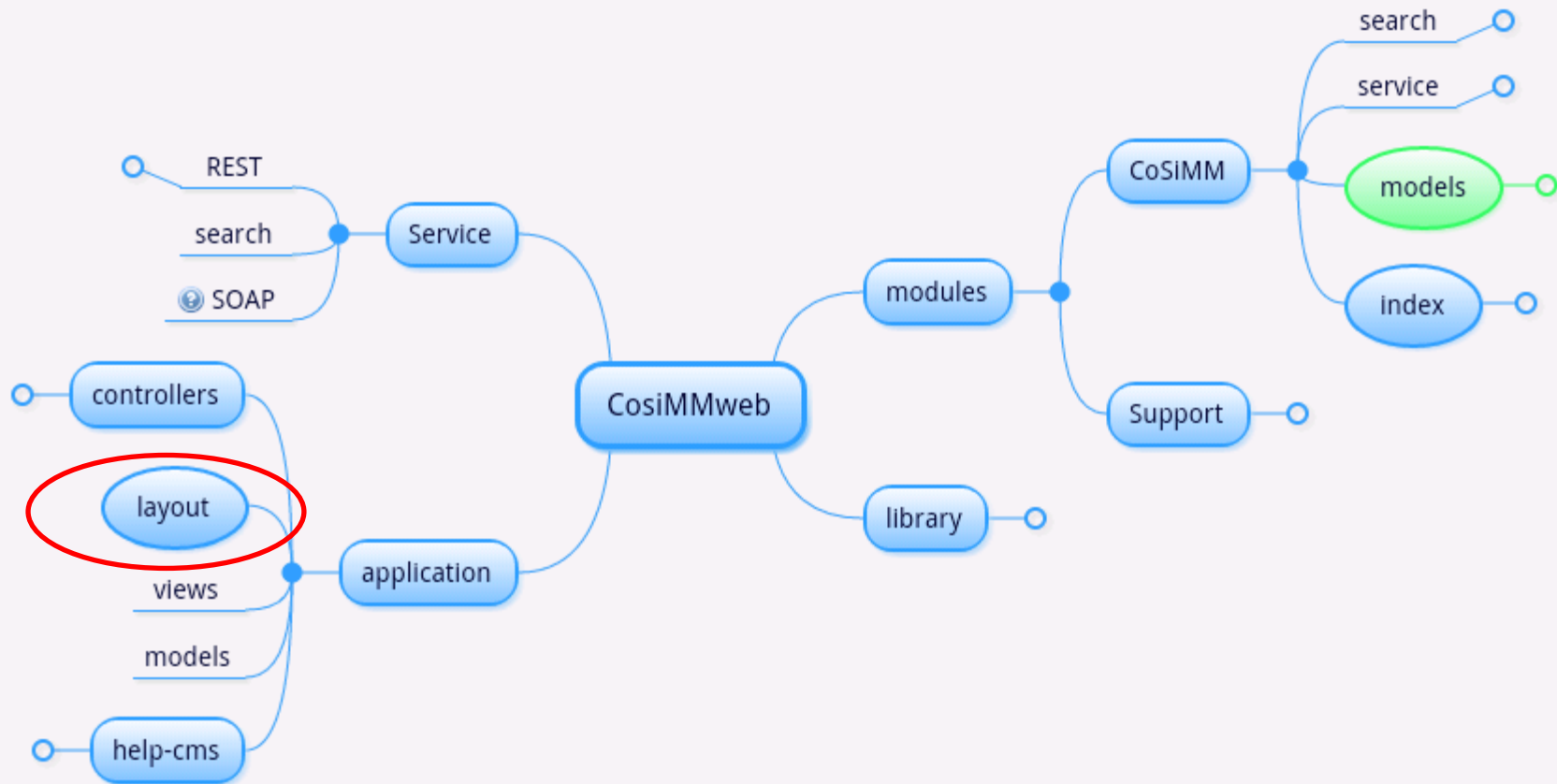
c_information
id INT(11)
institute_id INT(11)
full_name VARCHAR(20)
address VARCHAR(20)
phone VARCHAR(20)
email VARCHAR(20)
Indexes

c_machine
id INT(11)
loginstring VARCHAR(128)
description_id INT(11)
Indexes
PRIMARY

CosimmWeb



CosimmWeb



CoSiMM: Implementation

- ***Design:***

- ***Model View Controller***(MVC) paradigm
- ***Fat Domain Model*** is used.
- Data Base Abstraction layer (Default is MySQL):
No single SQL line in the code, as a storage can be used any SQL engine

- ***Implementation:***

- Zend Framework: a mature PHP framework with rich helper classes
- Modular structure allows to extend easily.
- Friendly UI is designed by JQuery-UI JavaScript library.

Security Model: ACL

- Share resources between modules
- The ACL allows to share the data between users in the same group:

– Ex:

```
$acl = new Zend_Acl();  
$acl->addRole(new Zend_Acl_Role('guest'));  
$acl->addRole(new Zend_Acl_Role('user'), 'guest');  
$acl->addRole(new Zend_Acl_Role('administrator'), 'user');  
  
$acl->add(new Zend_Acl_Resource('search'));  
//Allow users to search  
$acl->allow('guest', 'search', array('index', 'search'));
```

- Not Familiar with PHP and Zend?
 - CoSiMMWeb admin center does this for you.

Talking with other applications :

- REST: <http://cosimm.site/cosimm/rest?method=listProjects>

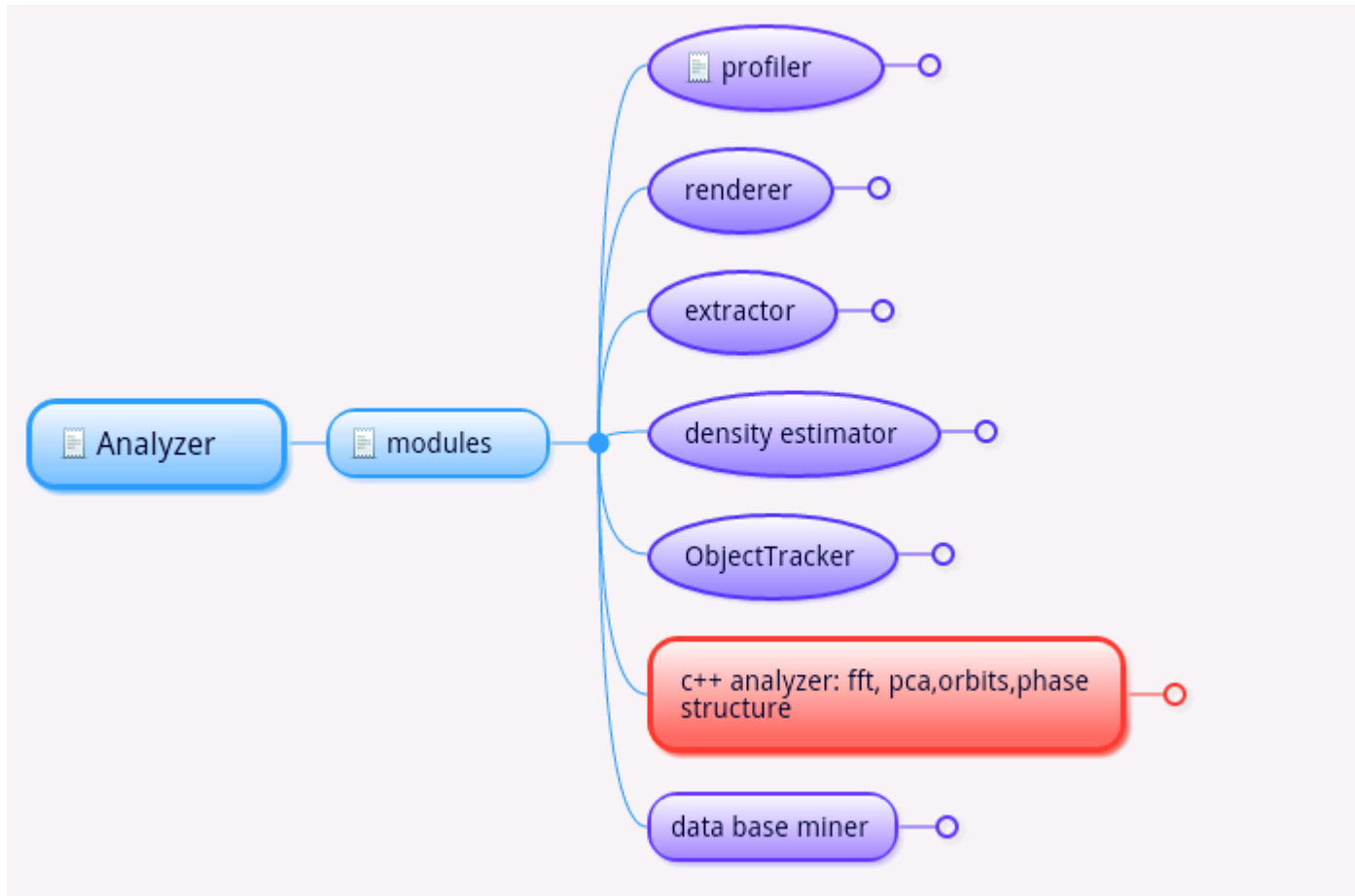
```
<Cosimm_Service_Cosimm generator="cosimm_api" version="1.0">  
  <listProjects>  
    <response>  
      <message>No Projects in database </message>  
    </response>  
    <status>failed</status>  
  </listProjects>  
</Cosimm_Service_Cosimm>
```

- SOAP and WSDL: <http://cosimm.site/cosimm/soap?wsdl>

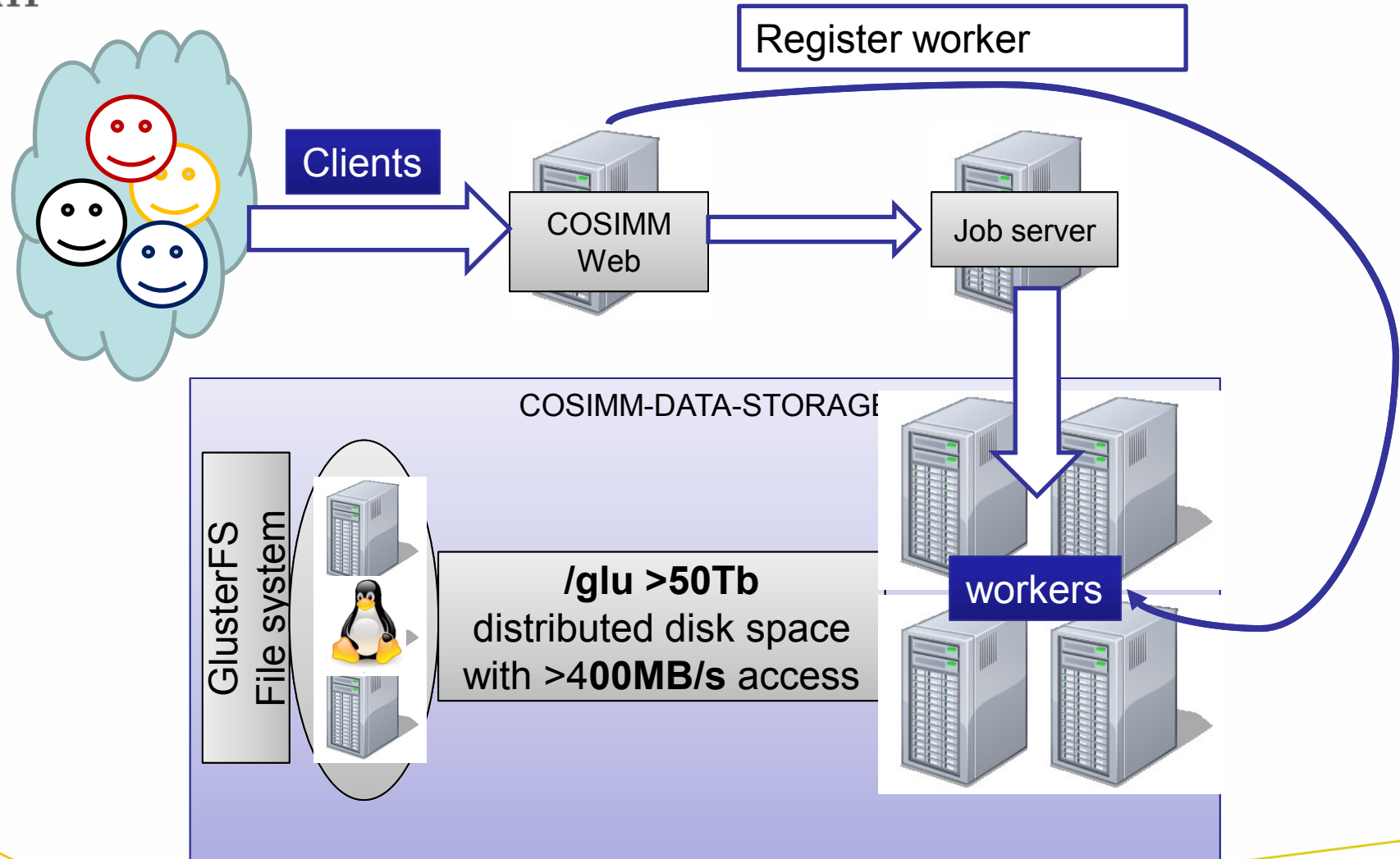
Talking with other applications :

```
-<definitions name="Cosimm_Service_Cosimm" targetNamespace="http://cosimm.site/cosimm/soap">
  -<types>
    <xsd:schema targetNamespace="http://cosimm.site/cosimm/soap"/>
  </types>
  -<portType name="Cosimm_Service_CosimmPort">
    -<operation name="getProject">
      <documentation>Returns project name by Id</documentation>
      <input message="tns:getProjectIn"/>
      <output message="tns:getProjectOut"/>
    </operation>
    -<operation name="listProjects">
      <documentation>Returns all registered Projects</documentation>
      <input message="tns:listProjectsIn"/>
      <output message="tns:listProjectsOut"/>
    </operation>
  </portType>
  -<binding name="Cosimm_Service_CosimmBinding" type="tns:Cosimm_Service_CosimmPort">
    <soap:binding style="rpc" transport="http://schemas.xmlsoap.org/soap/http"/>
    -<operation name="getProject">
```

Extending CoSiMMWeb: modules



CoSiMMWeb as an Elastic cloud



Summary

- CoSiMMWeb is a collaborative framework
- The modularity allows us to add different functionality:
 - Queuing system job submission,
 - Automated analysis pipeline for common algorithms:
 - Halos, Tracking, Profiles
 - Remote rendering servers
 - Snapshots or time evolution for different components
 - Mock observational images
- Near future:
 - Making CoSiMMv2.0 for CLUES public
- Adding SimDM service when it is matured.